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# Principles for creating “Acceptance” and “Network Effect” for the Digital Shekel





## Bank of Israel - The Bank of Israel Steering Committee on the Potential of a Digital Shekel Issuance

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# Table of Contents

## 01

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Introduction

## 02

---

Creating a network effect

## 03

---

Merchants' business considerations in deciding whether to adopt a new means of payment

## 04

---

Technological requirements that will lead to the successful adoption of the digital shekel

## 05

---

Defining the digital shekel as "legal tender"

## 06

---

Interface for future payment applications

## 07

---

Offline payments

## 08

---

Cross-Border Payments

## 09

---

Conclusion

## 10

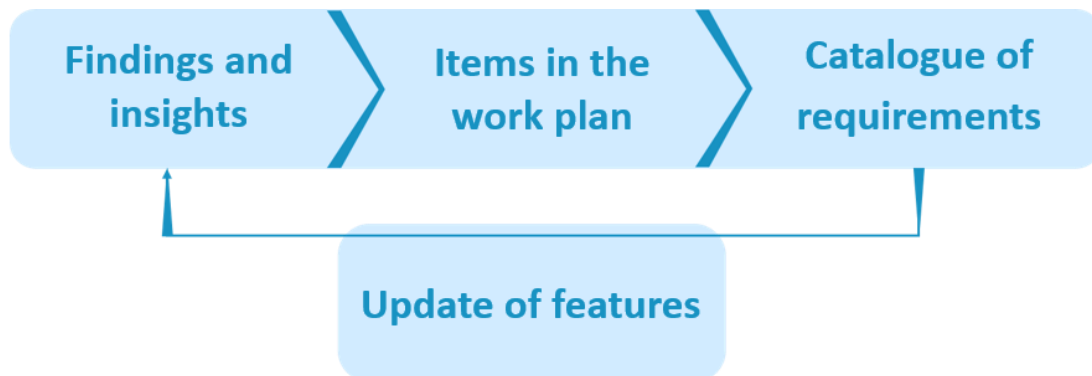
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References



## 1. Introduction

Similar to many other central banks, the Bank of Israel is constructing a potential program for a scenario in which it is decided to issue a central bank digital currency (CBDC). As part of the digital shekel project's work plan, the project's team has created a draft "requirements catalogue", based on initial thinking regarding the features that are necessary for the digital shekel to serve the policy objectives set out in the Steering Committee's May 2021 document (Bank of Israel, 2021a). The requirements catalogue raises various policy and specification questions that are being examined as part of the project team's ongoing work. The catalogue is regularly updated based on the findings of the various work items—existing features are improved and optimized, the knowledge base is expanded for future tasks, and new work items are set as needed.



Among the various aspects that the project is examining, the issue of acceptance<sup>1</sup> of a new means of payment has risen—how to ensure that the digital shekel will be adopted by various end-users. A necessary condition that will assure that the issuance of a digital shekel will generate significant benefit for the public is that it would be adopted by a sufficient quantity of users, which will provide an incentive for other users and merchants to adopt it, thereby creating a network effect.

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<sup>1</sup> Acceptance- The preparedness of any entity to accept a particular means of payment.



It should be noted that the adoption of a digital shekel is a complex issue. On the one hand, as this document discusses, a large number of users must adopt a digital shekel in order for it to achieve its objectives. On the other hand, there is also a potentially problematic side to the issue, in that the transition of some of the public's current deposits to a digital shekel may have a significant effect on the structure and quality of the banking system's financing sources, costs of financing, and the volume and price of credit to the public. The team's previous document (Bank of Israel, 2022a) discusses this aspect of the issue.

This document has seven parts. It examines the features that are necessary in order to generate a broad adoption of a digital shekel by the public as a means of payment, and the creation of a network effect. It discusses the structure of the incentives of merchants in relation to the adoption of a new method of payment. It examines the technological requirements that would lead to successful adoption of a digital shekel. It then discusses the digital shekel as a legal tender, and its implications for the potential adoption of the digital shekel. Finally, three short discussions are conducted regarding the future payment applications, offline payments, and cross-border payments, and the way these will affect the design of the digital shekel during its development stages, with the aim of making it attractive compared to existing means of payment and creating broad adoption scopes.

We would like to clarify that this document raises various issues for discussion and examination, but does not explicitly set out any Bank of Israel decisions that may be made as part of a future work plan. For instance, discussion issues that may arise in this document, such as obligating financial entities to participate, and bearing the costs of the digital shekel system, are issues that are currently being examined by the Bank, and as of the writing of this document, no decisions have yet been made regarding any measures that the Bank of Israel may take in these areas.

## 2. Creating a network effect

The success of a new means of payment depends on the creation of a network effect among its users, since a payment transactions is, by its very nature, a bilateral transaction: A particular means of payment can only be used if the corresponding party accepts it. Creating a network effect for a means of payment depends on its broad adoption by both parties. Consumers will use a digital shekel only if many merchants accept it, and merchants will accept it only if there is a sufficient number of consumers who are interested in using it.



The literature, (BIS, 2021) for example, points to three main factors in creating a network effect for a means of payment: acceptance of the means of payment by government agencies, a convenient and efficient payment experience, and supporting the possibility of payment among individuals (peer-to-peer, hereinafter P2P).

## 2.1 The government as “the largest merchant in the country”

The government, through its various agencies, is the largest payer and payment receiver in the economy. As such, it can fill a significant role in creating a network effect that would ensure the broad adoption of a digital shekel.

If the government enables citizens, as individuals or as merchants, to choose to use a digital shekel to pay fines, fees, taxes, and so forth, and to receive payments (benefits, refunds, payments to merchants and suppliers), it would assist the digital shekel to attain acceptance in the entire economy, both due to the creation of such a network effect, and due to the government’s special status in the economy and the public legitimacy this would grant to the digital shekel, beyond the fact that it would be issued by the Bank of Israel.

The State is also the largest employer in the economy, with hundreds of thousands of employees through the multitude of government ministries.<sup>2</sup> Public institutions can encourage the use of a digital shekel by transferring salaries to employees who wish to use this alternative. Such a decision would increase the adoption of a digital shekel in two ways. First, it would lead employees who receive their salaries in digital shekels to use them for making purchases at merchants. Second, it may also cause private sector employers to enable their employees to receive their salaries in digital shekels should they want to do so.

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<sup>2</sup> For information about the government's salary expenses, see the state's financial statements for December 31, 2021. Salary expenses include the costs of employing the employees of the State of Israel, including the associated rights due to employees by virtue of the various salary laws



## 2.2 The payment experience

Even a means of payment that may provide a lot of benefit, may not be broadly adopted if the payment experience is not positive and preferable to that of other means of payment. For the purpose of this document, discussions were held with financial officers of large companies in the Israeli economy, which operate payment services for large customer bases from the fields of tourism, retail, and finance. These company representatives outlined a number of characteristics of means of payment that are important and could be valuable to the consumers they serve:

- A convenient interface – It is important that the consumer is familiar with the payment device used to make the payment at the businesses and that the device is easy to operate. The multiplicity of devices complicates the payment experience. The various companies noted that the payment experience has improved in recent years due to the entry of the EMV standard<sup>3</sup> that enables contactless payment via cellphone or payment card. In order to create a network effect, it is important that digital shekel payments would be convenient at least at the same level, and if possible that it would be based on the same end-user devices that the customer already knows.

One of the technologies that has become popular among Israeli consumers is contactless payments.<sup>4</sup> Among terminals that support contactless payment, about 15 percent of transactions exceed the maximum amount that can be paid using the technology (NIS 300).<sup>5</sup> Of the remaining 85 percent, the absolute majority of transactions (about 80 percent) are made using contactless technology. It will be easier for the general public to adopt the digital shekel if the payment experience remains the same without substantially changing consumers' consumption habits.

- Sense of security with the interface – In order for the volume of use to be high, customers must feel secure in using the means of payment. This consideration is especially true regarding consumers with low digital literacy, who have difficulty making transactions that require the use of new technologies.
- Availability and immediacy – Consumers occasionally prefer to make deferred payments, but there may be circumstances in which the consumer, the merchant, or both will need to make an immediate

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<sup>3</sup> A common international standard for ensuring payment card transactions.

<sup>4</sup> This technology, based on radio frequencies or NFC technology, enables payment by waving a card or device at the point of sale, without needing to key in a PIN code or affix a signature. One of the advantages of this technology is reflected in shorter lines due to shorter transaction completion times and the reduced number of actions necessary to complete it.

<sup>5</sup> This restriction applies when using a physical payment card, but not when using a mobile phone.



payment, or at least to receive immediate certainty regarding the payment. For some transaction types, even if the payment by application is not immediate and there is a delay in crediting the customer's bank account, it is important that the customer will receive an immediate indication of receiving the money. This feature improves the customer's experience, and makes the need of the customer to clarify with the payer's customer service representative regarding when the payment transfer date, redundant.

## 2.3 P2P payments

The global experience shows that in many cases, the successful adoption of a means of payment and creation of a network effect are based on creating high usability in the P2P realm as an accelerant for successful adoption by businesses (BIS, 2021). In other words, the broad use of a digital shekel as a means for making payments between individuals will lead to a situation where merchants will have an incentive to accept the currency as well.

The digital P2P transfers market gained momentum in Israel in recent years thanks to the introduction of designated payment applications. In 2020, the activity in payment applications grew by 100%, the number of transactions exceeded 50 million and the amount of transactions in those applications reached more than 10 billion NIS. This is according to a study by the Israeli Competition Authority that dealt with the worlds of payment between individuals in payment applications (Israel Competition Authority, 2021). Furthermore, among all possible means of payment for P2P transfers, Israelis prefer payment applications.<sup>6</sup> Currently, P2P services are provided for free<sup>7</sup> by the various payment applications. The applications have not yet formulated a profitable business model, and a digital shekel may capture part of this market share, or increase the total activity in the P2P market, and become entrenched as a means of payment that can provide the public with a long-term solution to this need.

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<sup>6</sup> Taken from a survey conducted by the Payment and Settlement Systems Department regarding public preferences of means of payment, June 20, 2022.

<sup>7</sup> Under certain circumstances, receiving a payment using an application may involve the payment of a customer-executed transaction fee.





## 2.4 Obligating the banks and large payment service providers to participate

In order to increase the volume of use, the Bank of Israel may adopt a policy that would require financial firms, particularly the commercial banks (either all of them or from a certain threshold), credit card companies, and other major payment service providers should any be established, to serve as “payment providers” in a digital shekel system, and to provide customers with digital shekel wallet services. The draft model that the Steering Committee published (Bank of Israel, 2021a) outlines a two-tiered model, according to which the Bank of Israel will provide a digital shekel through payment providers, who will serve the general public and enable various transactions to be performed using a digital shekel. These agents would operate in accordance with an independent business model that they would formulate. However, just as the Bank of Israel imposes various obligations on supervised entities and requires them to issue means of payment such as immediate debit cards to their customers, it may also adopt a similar approach and require various financial institutions to provide digital shekel services to their customers.

In the world there are examples of situations where central banks required the essential financial entities to participate in a new payment system. In November 2020, an instant payment platform called “Pix”<sup>8</sup> was launched in Brazil (BIS, 2022). As a regulatory act, the Banco Central do Brasil required the country’s large commercial banks and other main payment providers to participate in the initiative and to provide customers with access to the new payment system. This guideline led to broad adoption by a significant quantity of users, which led to the accumulation of a network effect. Obligating the main entities to participate in the initiative also encouraged competing entities to join. Small banks and nonbank payment service providers that were not required to provide their customers with access to this payment system rapidly joined the initiative—not due to any obligation, but since they saw the business potential inherent in the project (BIS, 2022).

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<sup>8</sup> A new digital means of payment that is operated and maintained by the Brazilian central bank (Banco Central do Brasil).



## 2.5 Obligating merchants to participate

As stated, the adoption of a digital shekel depends on two main factors: consumers and merchants. The more attractive a digital shekel is in the eyes of consumers, leading to broader use, the greater incentive merchants will have to adopt this payment method and the system it necessitates. However, if merchants might need to be motivated to adopt the new means of payment, the state might have to enact legislation to require merchants that meet certain criteria (size and volume of transactions, certain industries, etc.) to make the necessary adjustments to enable consumers to pay using a digital shekel.

## 3. Merchants' business considerations in deciding whether to adopt a new means of payment

When merchants consider what means of payment to accept, they mainly examine the number of consumers who wish to use that means of payment, and the operational cost involved in accepting it (BIS, 2021). Therefore, the more customers there are who would use a digital shekel, and the lower the operational costs are relative to current alternatives, the more merchants will be encouraged to adopt it.

### 3.1 Costs

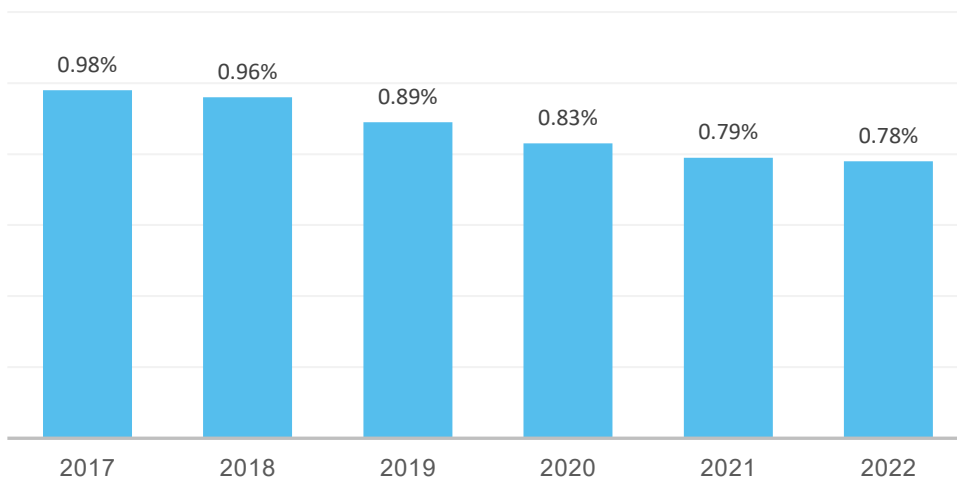
The global literature shows that the network effect inherent in the various payment platforms is one of the explanations for the concentration that exists in the payments industry, and leads to a lack of effective competition. After attaining significant monopolistic market power, large payment service providers charge significant fees from merchants, and sometimes from their customers as well (Carstens et al., 2021). The public infrastructure of a central bank digital currency may lead to the creation of a more competitive payments environment, featuring lower fees to both the consumer and the merchant.



In order to encourage adoption on the part of merchants, it is important that the cost to merchants be more attractive than the costs of existing alternatives—payment card settlement costs and the cost involved in the use of cash (operating the cash system, shipment, and costs due to loss or due to the receipt of counterfeit money).

In recent years, there has been a downward trend in the average settlement fee in Israel.<sup>9</sup> Despite this trend, the settlement fee still comprises a significant cost for some merchants, particularly small ones that pay a higher rate than large businesses in view of their lower settlement volumes. If the costs involved in receiving payments using a digital shekel are lower than the settlement fee, it would provide a major incentive to merchants to adopt a digital shekel.

**Figure 2:**  
**Average Settlement Fees, 2016–2021**



*SOURCE: Credit card companies' published financial statements.*

While cash payments involve no direct cost, they do come with indirect costs. These include the shipping of the cash, counting, loss, theft, and receipt of counterfeits. One of the largest retailers in the economy said that according to its assessments, the total cost of its cash operations comes to about 0.16 percent of its total cash flow. It is reasonable to assume that for small businesses, the cost is even higher. Although this is a single estimate that does not indicate a representative statistical finding for the entire market, but since it is a large retailer, it is likely that for small businesses the cost is even higher. The adoption of a digital shekel will be able to reduce costs for merchants relative to the existing payment alternatives.

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<sup>9</sup> A fee that the merchant acquirer charges the merchant.



### 3.2 Use of the digital shekel as a lever for streamlining the merchant's operations

In an economy that is becoming more digital, there is greater automation of the production and sales processes of goods and services. Processes that remain manual, such as payment at points of sale and payment of taxes to government authorities, delay merchants' digitalization and streamlining. Many firms, particularly small business that do not have designated departments that specialize in these fields, may find value in a means of payment that makes it possible to automate operational management. If a digital shekel is designed in a way that helps to more efficiently connect payments to other business processes, it may create an incentive for merchants to adopt a digital shekel.

For instance, a digital shekel may be designed in a way that enables micropayments.<sup>10</sup> This method should enable new digital applications and functions through which it would be possible to automatically direct tax payments to the authorities right at the point of sale, thereby minimizing the processes that are involved in tax payments (BIS, 2021).

## 4. Technological requirements that will lead to the successful adoption of the digital shekel

Technological innovation has completely changed the rules of the game in the world of payments in recent years. Technological solutions and innovative payment methods have created an environment in which transactions are made rapidly, and more simply than in the past. New participants that have entered this market have developed a variety of payment solutions that have led to the broad adoption of new means of payment.

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<sup>10</sup> For more information, see Section 6.1.



In order to create a network effect for a new means of payment, it is important for users to be able to use devices that they already possess, or that can be obtained easily and cheaply. If a large portion of users (payers) are able to pay with a digital shekel by accessing their digital wallet using a cellphone and/or computer, they won't need to make any major adjustments to software or hardware in order to use the new technology. For users who do not have such devices, or those with low technological literacy, it is important that they will also be able to use a digital shekel through other simple and convenient devices, such as a smartcard or bracelet, and that it will be easy and inexpensive to obtain such devices.

On the part of merchants as well, the use of existing technologies will help achieve a broad adoption of a digital shekel and reduce the costs involved in adapting to it. API-based technology<sup>11</sup> should make it easier to integrate merchants' existing payment terminals with future digital shekel systems. However, complete reliance on existing systems might have negative impacts on competition in the payments market (BIS, 2021), and might also harm the digital shekel's ability to support the redundancy and resilience of the payments system.

The various merchants with whom we discussed these issues raised the complexity of assimilating new payment systems and the costs that this involves. For instance, one large company with which we spoke noted the fact that the cost of adopting the EMV standard in all of the company's systems amounted to tens of millions of shekels. It is therefore important that merchants be able to use systems they already have, while make minimal adjustments in order to receive payments using a digital shekel.

In this context, we must distinguish between assimilating new hardware and the adoption of new software for existing systems. The assimilation of hardware is necessary when a merchant's terminals do not support a certain payment option, and the existing terminals must be replaced in order to enable payment with that new option. In contrast, the assimilation of software is necessary for those who have a terminal that supports the payment option but lacks the proper software for it. To the extent that a digital shekel will enable software adjustments on existing systems and not require merchants to replace existing systems, the adoption process will be simpler and less expensive for the merchant.

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<sup>11</sup> Application programming interface (API) is a means for computer systems to externalize data or allow their updating over the Internet protocol.



## 5. Defining the digital shekel as "legal tender"

The term “legal tender” reflects a country’s need to grant its currency a special status that ensures the public’s trust in it. It seems that if it is decided to issue a digital shekel that will be legal tender, legislative amendments will be necessary to remove any doubt as to its status.

The “legal tender” status, in general, is intended to ensure that anyone holding legal tender will be entitled to use it in order to pay his or her debts, while the counterparty will not be entitled to refuse to receive the payment if it is made using domestic legal tender, unless agreed to otherwise. Therefore, defining a digital shekel as legal tender will not necessarily lead to a situation in which merchants are obligated to accept payment using it. In addition, the literature points to cases in which laws that grant a certain currency the status of legal tender were insufficient to ensure broad adoption of that means of payment (ECB, 2022). However, defining a digital shekel as legal tender would apparently lead to the public granting a digital shekel the same status as cash, first and foremost in terms of its dependability and security, similar to the coins and banknotes issued by the Bank of Israel. It would therefore be expected to contribute to the acceptance of a digital shekel by households, merchants, and state authorities (particularly the Tax Authority).

## 6. Interface for future payment applications

While new technologies are changing the global financial system, the function of the central banks to maintain monetary and financial stability and the proper functioning of the payment systems remains as relevant as ever. Previously, central bank money could be used to make all payment transactions in the economy—purchasing goods, services, real estate, and so forth. With the advancement of digitization, an increasing number of transactions can no longer be made using central bank money. For instance, the purchase of securities used to be done by cash (and the securities themselves were represented by physical paper). For the past few decades, such purchases can only be made using funds in commercial accounts. Moreover, in recent years, more day-to-day actions (watching movies, reading newspapers, listening to music, and so forth) are moving to the digital realm, and payment for them is possible only using means of payment that accesses funds in a commercial bank account (payment card, digital wallet, and so forth). Even



for actions that are physical in nature, such as using public transit, cash issued by a central bank can no longer be used.<sup>12</sup> Thus, central bank cash is losing its ability to serve the public in a variety of economic transactions. This trend may increase as payment technologies advance and new payment applications are developed.

This section presents a short survey of future payment applications that a digital shekel may need to enable as an alternative to, or alongside, private sector money. If a digital shekel remains behind various other payment alternatives in terms of the ability to make payments in the future, it could have a negative impact on the desire of consumers and merchants to adopt it and use it, and thereby harm its acceptance in the long-term.

## 6.1 Micropayments

Micropayments are payments of very low value that may amount to a few Agorot, or even fractions of Agorot. There are a number of examples of transactions that are included in this category. These include purchasing digital content such as part of an article on a website, or paying for a digital application such as an add-on for a digital game. The term also includes the ability to sell data on an on-going basis against payment. For instance, a person may sell his location data for focused advertising purposes, and receive payment on a regular basis. In addition to the low value, some payments may have a high frequency that allows payment of very small amounts for some on-going use, such as parking for a particular period or payment for each electricity unit or drop of water that is consumed.

Micropayments must generally be made in real time, since they are connected to the immediate consumption of some resource. Today's digital payment methods do not properly support micropayments. Many payment methods (such as credit cards) are not immediate, and the cost of each transaction (and of the accompanying fees) make micropayments uneconomical. In addition, the way in which the payments are made is complex (for instance, inputting card details) and not consistent with low-value, high-frequency transactions, and do not enable spontaneous transactions without advance arrangement between the customer and the supplier.

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<sup>12</sup> In Israel, a "Rav-Kav" public transit card can be loaded by using cash as designated loading stations, but cash cannot be used to pay spontaneously for an unplanned trip. Moreover, loading the card in advance has liquidity implications for the customer, who is forced to pay in advance for a service that he may only consume days or weeks later.



## 6.2 Programmable payments

The motivation behind programmable payments is to include a certain logical in the payment process. For instance, a user can arrange for a payment to be made according to certain rules or preferences that are predetermined by the user. If condition X is met, payment Y will be made. For instance:

- Money that can only be used for payment if a purchase fulfills the legal definition.
- Money that can only be used on certain dates or times.
- Payment that is made only when certain conditions are met, such as payment that is transferred after a certain task is completed, compensation or insurance that is paid because relevant conditions have been met, and so forth.

Cryptocurrencies and systems based on blockchain technology generally include some form of smart contract. These contracts make it possible to write complex rules into the software to control the conditions under which transactions will be made. However, it is very difficult to ensure that it will be impossible for the contracts to “behave” in an unintended way, which may lead to fraud and exploitation of the system. We must therefore discuss the question of supervision over smart contracts, and clearly define who will be responsible for situations of breakdown, fraud, or any other unplanned scenario (Bank of Israel, 2022c).

## 6.3 Delivery versus Payment

This payment option may be created as a private use case of programmable payments. When a transaction is made, both parties need to be certain that the terms of the transaction have in fact been fulfilled. In other words, the purchase must be certain that the purchased asset is real—for instance that he has not purchased a fake ticket to a show—and the seller must be certain that the payment for the ticket has in fact been transferred.

By using cryptography and in transactions that involve digital assets, it can be determined that the asset is actually real before the payment is made, and thereby ensure the propriety of the transaction. The transfer of a digital asset for payment should be an “atomic transaction” —payment is made in full if the transaction meets the required conditions or is not made at all if it does not meet them.

## 6.4 Internet of Things (IoT)





The IoT deals with connecting devices and objects to an autonomous payments environment. The emphasis in this application is to provide devices with the ability to interact with each other and with the outside environment. These interactions would be autonomous in accordance with the rules or instructions programmed by the manufacturer or the owner. For instance, autonomous vehicles may be able to communicate between themselves and negotiate regarding a parking spot, and then pay autonomously for that parking spot.

IoT solutions are being developed in a wide variety of sectors, including smart homes, smart cities, retail sales, transportation, healthcare, and agriculture. In the future, when IoT interfaces are connected to each other, more flexible and mobile payments will be possible that will not need direct communication between two individuals in order to complete the transaction.

## 6.5 Decentralized Finance (DeFi)

The decentralized finance industry, which is in its initial stages, aims to provide financial services without the traditional intermediaries. It does so by leveraging distributed blockchain platforms and automated protocols (smart contracts) so that participants rely on those protocols rather than on traditional agents. However, the cases of extreme instability that have taken place on DeFi platforms in recent months have shown that there is still a long way to go before this market matures (BIS, 2021b). DeFi is currently not sufficiently regulated, and only a small amount of protection is provided to its participants.

A digital shekel should have a place in this developing ecosystem. There should be a number of aspects to its inclusion, including:

- Payment method within DeFi: Currently, transactions on this platform are generally made with the platform's original currency (for instance ethereum). Depending on the CBDC's design, it is possible that it may be used directly within those environments.
- If the CBDC is designed in a way that enables it to be directly traded within the DeFi, it will be necessary to take into account the economic risks of interrelationships between a world that is not yet regulated and a means of payment issued by a central bank, or to enable the use of CBDC only in a DeFi environment that is fully regulated.



## 6.6 Metaverse

“Metaverse” is a term that includes a wide variety of developments in the way that people communicate and interact in the digital world. This term expands what already exists on online gaming platforms to a more complex world in which economic activity is expected to develop.

Since the impact of the Metaverse on the financial world is not yet sufficiently clear, and in this sense the term is still abstract, it is difficult to precisely define how a digital shekel would support this ecosystem. However, there are a number of use cases that we can already see, in which CBDC could be integrated into the Metaverse.

- Alternative payment option: The option of paying with CBDC in the Metaverse would enable the CBDC to be an alternative to any payment method currently being used.
- Means of converting Metaverse payments to real-world payments. For instance, a content creator in the Metaverse may need a means of converting payments received in the Metaverse (such as platform currency) to commercial bank currency or central bank currency, so that he will be able to use that means of payment in the real world.

## 6.7 Implication for the design of the digital shekel

The main question that arises from the analysis of the new payment types and future payment applications is whether a digital shekel needs to “provide” these payment applications or whether it must only support such payment options.

If the various payment applications are “provided” by a digital shekel, it may have implications for the structure of the system. It will require a more complex application that does not rely solely on a digital shekel. For instance, in order for the digital shekel system to enable delivery-versus-payment (DVP), the system may need connectivity to other outside assets. In contrast, if the payments are “supported” by a digital shekel, then a significant portion of the innovation may come from outside the digital shekel system. In such a scenario, the intermediaries in a digital shekel network may fill the function of adapting the digital shekel to developing types of payment. The advantages and disadvantages of each approach are presented in Table 1:



**Table 1:**  
**A digital shekel that “provides” vs. a digital shekel that “supports” advanced payment applications – advantages and disadvantages**

	<b>Advantages</b>	<b>Disadvantages</b>
<b>A digital shekel that provides advanced payment applications</b>	<ul style="list-style-type: none"> <li>• May enable uses cases to progress faster.</li> <li>• Reduces the risk of payment system fragmentation.</li> <li>• Gives the Bank of have greater influence in the market.</li> </ul>	<ul style="list-style-type: none"> <li>• More complex to deliver.</li> <li>• Risk of scope becoming too large.</li> <li>• Innovation could become too dependent on Bank of Israel.</li> </ul>
<b>A digital shekel that supports advanced payment applications</b>	<ul style="list-style-type: none"> <li>• Enables the Bank of Israel to focus on the core requirements of the digital shekel.</li> <li>• Less complex to deliver.</li> <li>• Encourages private sector to innovate.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduces the Bank of Israel’s ability to influence the uses of the digital shekel in future use cases.</li> <li>• Use cases may be more fragmented</li> </ul>

There are a number of concrete implications on the design of a digital shekel, irrespective of the approach that is chosen:

- **A digital shekel will support API interfaces** – With the aim of enabling innovation and more sophisticated payment options in the future. A decision will need to be made later on as to whether these interfaces will be provided directly by the Bank of Israel or through technological agents.
- **A digital shekel will support very-high-value and very-low-value transactions** – Some future use cases, such as DeFi, may include transactions of very high values. In contrast, others, such as micropayments for IoT, will feature transactions of very low values. In order for a digital shekel to answer all needs and be universal, it is important that the design take both these requirements into consideration.
- **High levels of scalability and throughput** – The potential scope of future use cases particularly in cases involving the use of micropayments and IoT, will require good support of a transaction load that will increase.
- **Support for offline payments** – Some IoT uses will require that devices be able to make transactions when they are offline (for more information, see Section 7).



- **Visible and invisible payments** – For IoT payments, some transactions will take place without the end-user’s direct participation (payments will be made from device to device). For other payment types as well, such as micropayments, some payments may not be visible, such as when the purchase value (for instance a few Agorot for a news article) does not warrant a complex payment user experience. For other transactions with higher values, the user will likely need to be more directly involved.

## 7. Offline payments

For a digital shekel to be an effective and efficient tool in the world of payments, and for the public to want to adopt it, the system must have maximum availability. However, there may be cases in which standard online payments are not possible due to certain factors, such as:

- **Technological factors** – Israel’s electricity infrastructure is better developed than some other countries, and there is relatively high access to the cellular network.<sup>13</sup> However, in extreme situations, such as extreme weather conditions, natural disasters, and so forth, there may be electricity disruptions or failures of the communications infrastructure that would limit the use of online systems.

Another problem that may result from absolute reliance on **online payments** is the problem of throughput. If every digital shekel transaction needs to pass through a central network, it may lead to significant demands on capacity that could create a risk of bottleneck in the central infrastructure. Support for offline payments should be one of the ways of reducing performance risks. It would lower the costs of the central system, and enable the system’s growth in terms of the volume of transactions expected as a result of the possibility of micropayments.

- **Environmental factors** – In remote areas with no cellular reception, or in places where there is limited reception (such as underground parking lots), offline payments solutions will be necessary. In addition, there may be situations in which only one party to the transaction has a connection to the network, while the second is disconnected. These include situations in which the consumer’s cellphone is disconnected from the network but the merchant’s point of sale is connected. Under

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<sup>13</sup> According to World Bank data (<https://govdata360.worldbank.org>)



such circumstances, it may be possible to complete a transaction online, depending on the design of the system.

- **Social factors** – One of the motivations for allowing offline payments using a digital shekel may be due to financial inclusion considerations—enabling people who are not connected to the network and who unable to purchase connected devices to make transactions using a digital shekel. The World Economic Forum and the Bank of England cite accessibility and financial inclusion as main policy goals that can be achieved by supporting offline payment options (WEF, 2021).<sup>14</sup>

In cases where it is not possible to connect to the network, it will always be possible to pay with cash. However, as society changes its consumption habits and the use of cash declines, people will be less likely to hold cash.

In the context of the public's acceptance and adoption of a digital shekel, increasing digital shekel payment options, including in situations with limited connectivity to the network, could provide an incentive for the general public's adoption of a digital shekel.

## 8. Cross-Border Payments

Payments made from one economy to another, particularly if they involve currency conversions, are complex, slow, and expensive. A bank account in one economy must be debited, while an account in a different economy must be credited. This is a disadvantage point in the global payments system. Cross-border payments are generally made through a correspondent bank, and frequently through a number of such banks. It is a complex process that involves the use of various technological systems by different commercial banks in different economies, which extends the duration of the process. In addition, differences in regulation and in money laundering prohibition rules in different countries delay the process and make it even more expensive.

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<sup>14</sup> <https://www.bankofengland.co.uk/minutes/2022/march/minutes-of-cbdc-technology-forum-march-2022>



The Bank of Israel, together with the Bank for International Settlements (BIS) and the Norwegian and Swedish central banks, launched “Project Icebreaker”.<sup>15</sup> This project is a joint international trial examining how households and merchants can use CBDC to make and streamline cross-border payments.

If CBDC is shown to lower the cost of payment transfers between countries, it may provide a significant incentive to adopt a digital shekel. In Israel, using a payment card abroad or for paying for a foreign purchase (such as from foreign websites) is usually between 2.5 and 3 percent (including foreign exchange conversion costs), and withdrawing cash abroad costs even more (Bank of Israel, 2021). As a small and open economy, Israel can generate a considerable benefit from reducing the costs of cross-border payments, thereby influencing the volume of use of a digital shekel in general.

## 9. Conclusion

The digital shekel has the potential to become an important means of payment for the Israeli economy, as well as digital currencies that are currently being promoted by central banks in other countries. For that to happen, it is necessary to create a broad user base. P2P payments are a key to building such a user base and creating a network effect. This effect may expand if the government adopts a digital shekel as a means for making and receiving payments.

The establishment of an accessible technology platform for merchants and consumers, based on existing technologies, will make it easier to adopt digital shekel systems, and will lower the costs involved in adopting it. The more attractive these costs are relative to the existing alternatives in the payments market, the more merchants will want to adopt a digital shekel.

Defining a digital shekel as legal tender, and the option of using it to make offline payments may help in the initial adoption stages of the new means of payment, since the public may accord it a status similar to cash. Making cross-border payments less expensive may provide further motivation and encourage the public to adopt a digital shekel and use it to make payments. In order to prevent the possibility of the digital shekel lagging behind future payment alternatives technologically, its specifications in the development stages should enable future innovation as well.

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<sup>15</sup> [Project "Icebreaker"](#)



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