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**Legal Regulation of the Use of Distributed Ledger Technologies in the Financial Sector of Singapore**

**Regulación legal del uso de tecnologías de contabilidad distribuida en el sector financiero de Singapur**

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### Abstract

Singapore is one of the leading countries in digitalization and the use of blockchain technology. Since 2016, Singapore has been implementing the Ubin project to create a national digital currency. In 2019, Singapore passed the Payment Services Act. In addition, MAS has adopted many guidelines and clarifications on the legal regulation of digital tokens and cryptocurrencies, including anti-money laundering and counter-terrorist financing by cryptocurrency market participants. The paper aims to analyse Singapore's legislation as well as MAS policies and identify approaches that can be used as a basis for improving legislation in other states. Based on the analysis, it is concluded that Singapore extends the provisions of securities legislation to digital tokens, which have the characteristics of securities or futures. Digital tokens, which are cryptocurrencies, are regulated by the Payment Services Act containing criteria to distinguish payment tokens from other virtual objects. Using this approach minimizes difficulties in regulating the circulation of, for example, bitcoins. In addition, MAS has developed a set of rules enshrining requirements for cryptocurrency exchanges, which reduces the risks of fraud and money laundering using cryptocurrencies. The paper also analyses MAS reports on the development of a state's digital currency. Based on the content of the reports, it was found that the digital Singapore dollar is not a new form of money but a means for settlement and settlement of interbank liabilities. The blockchain used in the Ubin project is open-source and allows interaction with other systems created by both private banks and foreign financial regulators. The paper concludes that other states can use Singapore's experience to shape or modernize their legislation.

**Keywords:** Digital tokens; ICO; blockchain; cryptocurrency; project Ubin.

### Resumen

Singapur es uno de los países líderes en digitalización y uso de tecnología blockchain. Desde 2016, Singapur ha estado implementando el proyecto Ubin para crear una moneda digital nacional. En 2019, Singapur aprobó la Ley de servicios de pago. Además, MAS ha adoptado muchas pautas y aclaraciones sobre la regulación legal de los tokens digitales y las criptomonedas, incluida la lucha contra el lavado de dinero y la financiación del terrorismo por parte de los participantes del mercado de las criptomonedas. El documento tiene como objetivo analizar la legislación de Singapur, así como las políticas de MAS e identificar enfoques que se pueden utilizar como base para mejorar la legislación en otros estados. Con base en el análisis, se concluye que Singapur extiende las disposiciones de la legislación de valores a los tokens digitales, que tienen las características de valores o futuros. Los tokens digitales, que son criptomonedas, están regulados por la Ley de Servicios de Pago que contiene criterios para distinguir los tokens de pago de otros objetos virtuales. El uso de este enfoque minimiza las dificultades para regular la circulación de, por ejemplo, bitcoins. Además, MAS ha desarrollado un conjunto de reglas que consagran los requisitos para los intercambios de criptomonedas, lo que reduce los riesgos de fraude y lavado de dinero utilizando criptomonedas. El documento también analiza los informes de MAS sobre el desarrollo de la moneda digital de un estado. Con base en el contenido de los informes, se encontró que el dólar de Singapur digital no es una nueva forma de dinero, sino un medio para liquidar y liquidar pasivos interbancarios. La cadena de bloques utilizada en el proyecto Ubin es de código abierto y permite la interacción con otros sistemas creados tanto por bancos privados como por reguladores financieros extranjeros. El documento concluye que otros estados pueden utilizar la experiencia de Singapur para dar forma o modernizar su legislación.

**Palabras clave:** tokens digitales; ICO; blockchain; criptomoneda; proyecto Ubin.

## Introduction

The development of digital technology, particularly blockchain, has led to completely new ways of doing business in finance (Lee & Deng, 2018). These processes are largely due to the emergence of digital tokens, which have led to the emergence and development of the initial coin offering (ICO) phenomenon which is an innovative way to attract funding (Yano, Dai, Masuda, & Kishimoto, 2020). In its purpose, ICO can be compared to the issue of shares in the securities market (Alekseenko, 2020), and the legal nature of issued digital financial assets, or tokens, which confirm the owner's right to participate in a project; they can be described as similar to the legal nature of shares and stakes in the share capital of business entities.

One of the states where the implementation and regulation of various digital technologies is successfully carried out is Singapore (Gorian, 2018). At the same time, as noted by experts, Singapore belongs to the category of countries with a high index of digital evolution and high growth rates of the digital economy (Arner, Barberis, & Buckley, 2016). The main focus in this country is the development of the financial sector (Ang, Kwek, & Shergill, 2020). In its efforts to transform Singapore into a global fintech hub, the Monetary Authority of Singapore (MAS) has adopted a smart financial center concept as part of the Smart Nation initiative to enable better risk management and the development of new financial services in a digital environment (Chuen & Lee, 2017). This policy has resulted in the implementation of several projects in the financial sector.

Singapore is also a leader in the introduction of public digital currencies (Náñez Alonso, Echarte Fernández, Sanz Bas, & Kaczmarek, 2020). In 2016, MAS, together with leading financial industry representatives in the world (Bank of America, Merrill Lynch, Credit Suisse, DBS Bank, HSBC, JP Morgan, Mitsubishi UFJ Financial Group, OCBC, R3, Singapore Exchange, United Overseas Bank), technology partners (BCS Information Systems), and foreign financial regulators (Bank of Canada) launched the Ubin Digital Singapore Dollar project. It reached its final stage in 2020. Its goal is to explore blockchain technology for clearing, settlement, and securities (Auer, Cornelli, & Frost, 2020). Several reports have been published on the results of the project. The paper considers and analyses Project Ubin Report: SGD on Distributed Ledger, which

assesses the prospects of blockchain technology implementation in the financial system of Singapore. The report Delivery versus Payment on Distributed Ledger Technologies, which gives a comprehensive insight into automation of DvP (Delivery versus Payment) settlement processes using smart contracts, is also studied. The paper analyses a joint report by the Bank of Canada, Bank of England, and MAS on the fourth phase of the Ubin Cross-Border Interbank Payments and Settlements project. The report assesses the prospects of cross-border cross-currency payments using digital currencies of a central bank. Also, it deals with modeling the settlement system, its speed, cost, and transparency to users. The Bank of Canada and MAS report “Jasper-Ubin Design Paper: Enabling Cross-Border High-Value Transfer using DLT” also addresses these issues. It proposes various design options for cross-border settlement systems and describes the results of the Jasper and Ubin pilot domestic payment networks in Singapore and Canada. In July 2020, a report on the latest phase of the Ubin Project, Ubin Phase 5: Enabling Wide Ecosystem Opportunities, on the technical aspects of the blockchain-based multi-currency payment network and its benefits was published (Astakhova, E.V., 2020).

## **Materials and Methods**

All of the above makes it necessary to study, interpret and analyze Singapore’s experience in the legal regulation of distributed ledger technologies in the financial markets. Therefore, the purpose of this paper is to identify approaches to the legal regulation of digital currencies and digital tokens in Singapore, as well as to formulate proposals on their basis to modernize the legislation of states where end-to-end digital technologies are outside the legal field.

## **Results and Discussion**

### **Regulation of ICOs in Singapore**

Singapore’s policy is to become the most favorable place to conduct ICOs (Lausen, 2019). Thus, in 2018 Singapore has become the world’s second-largest fundraiser

through ICOs. Digital token sales registered in this state in 2018 raised more than 1.6 billion U.S. dollars (Greene & Chuen, 2019).

Considering blockchain as a “fundamental” technology, MAS classified digital assets into three groups: payment tokens, utility tokens, and security tokens (Cheah, Pattalachinti, & Ho, 2018). The regulation of tokens in the capacity of securities and the procedure for their issuance in Singapore is based on the legislation on the local securities market. Today, the legal basis for ICO regulation in Singapore is the Securities and Futures Act and the Financial Advisers Act (Cap. 110). Following paragraph 2 (1) of the Securities and Futures Act, MAS, in addition to the financial products listed therein, may regulate other objects that, in its opinion, are traded in the financial market. Therefore, the turnover of digital tokens must fully comply with the Securities and Futures Act requirements.

If the ICO is supposed to be public, then, according to Singapore law, the issuer must prepare and register a prospectus; that is, the issuer must fully disclose information about the person seeking funding in this way. As the researchers note, the rules of conduct related to the honest conduct of business will be triggered in this case. (Kaal, 2018). Note that under Section 272A of the Securities and Futures Act, the issuer is exempted from compliance with the prospectus requirements if the ICO will not be public, i.e., when the issue is not more than SGD 5 million in any 12-month period; the number of acquirers is not more than 50 persons; the offer has been made only to institutional investors or accredited investors.

In summary, the issuance of digital tokens, which grant some sort of claim and are inherently securities and derivatives, are subject to regulation under Title XIII of the Securities and Futures Act, just like any other offer of securities made by traditional means.

Special requirements are imposed on persons who are operators of platforms used to conduct ICOs. As follows from the MAS clarification, if digital tokens have the characteristics of securities or futures contracts, no activities related to their circulation

can be carried out without the relevant permission.<sup>1</sup> Thus, in its press release, the department warned eight digital exchanges to obtain permission and register as an approved exchange or recognized market operator and also required issuers to stop selling their digital tokens in Singapore through ICOs.<sup>2</sup>

Based on the Securities and Futures Act and the Financial Advisers Act, a person who operates a digital token platform in Singapore, which is a financial product, must hold a Capital Markets Services License and a Financial Advisers License. The application requirements for these licenses are no different from those for “traditional” participation in financial market activities. They follow the Guidelines on Criteria for the Grant of a Financial Adviser’s Licence (Guideline No. FAA-G01) and Guidelines on Licence Applications, Representative Notification and Payment of Fees (Guideline No. CMG-G01) Note that if the issuer is advising investors on the financial products that it will offer, such as tokens to back the shares of the issuer, it will also need a license because it will then be treated as a financial adviser.

Singapore extends its laws in this matter extraterritorially. Based on paragraph 339 of the Securities and Futures Act, if a person operates a basic ICO or digital token trading platform in Singapore and outside of Singapore (or only outside of Singapore), they are extraterritorially subject to this law. Therefore, if a person located overseas engages in any activity related to the placement of tokens among Singaporean citizens through a website operating in that state, it automatically means that he is considered a financial advisor. Therefore he is required to obtain a license. The application of extraterritoriality provides a basis for authorized persons to prosecute violators of the Securities and Futures Act regardless of where they are located and where the offense was committed. As explained by the MAS in Guidelines on the Application of Section 339 (Extraterritoriality) of the Securities and Futures Act (CAP. 289) Guideline No: SFA 15-G01, the Singapore courts may try for an offense where the act is committed partly in Singapore and partly outside Singapore or where the act is committed entirely outside

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<sup>1</sup> A Guide to Digital Token Offerings 2017 [digital source]. URL: <https://www.mas.gov.sg/regulation/explainers/a-guide-to-digital-token-offerings>

<sup>2</sup> MAS warns Digital Token Exchanges and ICO Issuer [digital source]. URL: <https://www.mas.gov.sg/news/media-releases/2018/mas-warns-digital-token-exchanges-and-ico-issuer>

Singapore but has a substantial and reasonably foreseeable effect in Singapore, provided that the act, when committed in Singapore, would be a breach of law.

### **Cryptocurrency is a digital payment token**

Singapore is among the states that have shown the greatest interest in regulating cryptocurrencies (Fosso Wamba, Kala Kamdjoug, Epie Bawack, & Keogh, 2020). Singapore has approached the relationship between money and cryptocurrency by recognizing payment tokens (cryptocurrency) as a unit of account or a digital representation of value. Thus, according to Article 2 (1) of the Payment Services Act, a digital payment token is any digital representation of value that is expressed in units not denominated in any currency and not tied by its issuer to any currency; it acts as a medium of exchange, is accepted by society or part of society as payment for goods or services or to pay off a debt; it also can be transferred, stored or sold electronically; it also meets other characteristics that MAS may prescribe.

The definition of a payment token is also contained in the Goods and Services Tax Act. It is identical to the one above, except that for tax purposes, the Secretary may add to, modify, or delete any characters in the digital payment token subsection, either generally or for specific circumstances. This approach, on the one hand, can be considered progressive since cryptocurrencies are still not sufficiently studied. In addition, new types of them are not excluded, which makes it necessary to respond quickly to the changes that occur. On the other hand, the legislator actually delegates its powers to formulate the definition of payment token to other bodies, which can hardly be evaluated positively.

Perhaps the most misunderstood element of a payment token's definition is that it is accepted by the public or part of the public as a means of payment for goods or services or a means to pay off a debt. There is no exhaustive definition of "cryptocurrency" in the Payment Services Act, and the one available is extremely broad, as it is not clear what constitutes "acceptance by the public" and how to properly define a "part of the public" (Lin, 2019). This, she believes, could lead to confusion and uncertainty for those who use virtual currencies in the course of their activities and the

risk of becoming subject to regulatory scrutiny by the Monetary Authority. In this regard, it would be advisable for the regulatory authorities to prepare a clarification in this regard.

As there are different types of digital tokens, Singapore has made an important clarification in the Payment Services Act. Part 2 of Schedule 1 to the Act states that the payment tokens regulated by the said regulation do not include any tokens that are issued by any central bank or any person authorized by the central bank to issue such tokens. Apparently, this is because such cryptocurrencies have a well-known issuer, which, in addition, cannot issue them without any collateral, because otherwise, it risks undermining the state's financial stability. In this regard, such cryptocurrencies are essentially nothing more than electronic money or debt securities issued on the basis of blockchain technology.

Another important issue addressed in the analyzed law is distinguishing cryptocurrency as an object circulating in the financial market from other similar virtual currencies. For this purpose, Singapore introduces the Payment Services Act as a limited-purpose digital payment token. Such digital objects are tokens arising as customer loyalty rewards, any gaming assets, or any similar digital representation of value that cannot be returned to its issuer in exchange for money and can only be used to pay for goods or services or to pay for or exchange for virtual objects or virtual services in an online game. Article 2A of the Goods and Services Tax Act also states that a digital payment token is not anything that gives the right to receive or direct the delivery of goods or services from a specific person or persons and ceases to function as a medium of exchange once the right has been used.

According to article 6 (4) of the Payment Services Act, cryptocurrency transactions are subject to licensing, and the person performing them must obtain a standard payment institution license or a major payment institution license. The law emphasizes that transactions include the purchase and sale of digital payment tokens for money on a cryptocurrency exchange and their exchange for other digital payment tokens. At the same time, part 3 of Annex 1 to the analyzed law stipulates that the licensed activities do not include acceptance of any digital payment token as a means of payment for the



provision of goods or services or use of any digital payment token as a means of payment for the provision of goods or services.

So, the considered approach of the Singapore legislator to distinguish cryptocurrency from other digital tokens and gaming currencies seems noteworthy, as it allows forming a clear idea of what is clearly not a cryptocurrency. REICE | 114

At the same time, some authors criticize the Payment Services Act. Thus, it is noted that if we talk about complex cryptocurrencies such as JOCOIN, the legislation on cryptocurrency is ineffective because it can be applied not only to the Payment Services Act but also to the securities market and other laws, especially if the cryptocurrency has a security in the form of any commodity (Koh, 2020). According to the author in question, the application of the Howey Test<sup>3</sup> allows digital payment tokens to be recognized as securities. Another argument against the Payment Services Act is that cryptocurrency users are afforded protection under securities law because it requires issuers to disclose (Koh, Crypto Conundrum Part II: A Multi-Jurisdictional Uncertainty, 2020). This criticism, however, does not seem fully justified, as it does not take into account the fact that Bitcoin has no issuer, which means that the rules regarding securities cannot be applied to it.

Based on the nature of cryptocurrency, especially Bitcoin, it is challenging to build a model of its legal regulation. Giving cryptocurrency the status of a digital representation of value and recognizing it as a unit of account allows us to move away from the debate about whether it is a competitor to money. Of course, the Payment Services Act is not without its flaws, but the way it draws the line between payment and other tokens should be used in rulemaking. The main difficulty seems to be that using a digital representation of the value regime for cryptocurrency requires either establishing an extraterritorial regulatory regime for cryptocurrency exchanges or the adoption of an international agreement in this area.

Payment Services Act enshrined the concept of a payment services provider, i.e., a cryptocurrency exchange. The law defines a digital payment token exchange as a place,

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<sup>3</sup> Securities and Exchange Commission v. WJ Howey Co., 60 F. Supp. 440 (S.D. Fla. 1945). URL: <https://law.justia.com/cases/federal/district-courts/FSupp/60/440/1968914/>

or facility (electronic or otherwise) where offers or invitations to buy or sell any digital payment token in exchange for any money or any other digital payment token (of the same or another type) are regularly made centrally. According to article 6 (4) of the Payment Services Act, the activities of organizations engaged in transactions with cryptocurrency (purchase, sale, exchange) are subject to licensing with the mandatory receipt of one of three license types: standard license of the payment institution, license of the large payment institution, license for money exchange. The need for one or another license depends on the list of operations that the organization intends to perform and is determined according to the Payment Services Regulations. The cost of a license for an organization engaged in business related to cryptocurrency, for example, a standard payment institution, is 1000 SGD. At the same time, according to part 3 of Annex 1 to the analyzed law, the licensed activities do not include acceptance of any digital payment token as a means of payment for the provision of goods or services or use of any digital payment token as a means of payment for the provision of goods or services.

Paragraph 9, Article 6 of the Payment Services Act sets out the requirements that an applicant must meet for a standard payment institution license or a major payment institution license. In particular, the applicant may be a legal entity (including one incorporated outside of Singapore) that has its registered office in Singapore and which executive director is a citizen or permanent resident of Singapore. However, article 7 (1) of the Payment Services Regulations clarifies that the director of the applicant must have the right to be employed in Singapore.

According to Article 6(9)(d) of the Payment Services Act, the applicant must also meet the financial requirements that MAS may prescribe. Article 8 of the Payment Services Regulations stipulates that if an applicant applies for a standard payment institution license, its registered capital must be at least SGD 100,000 if the applicant is a Singapore entity. If the applicant is a foreign company, the net equity of the head office must be at least SGD 100 thousand. In the case of an application for a license of a large payment institution, the specified requirements are 250 thousand SGD. According to point 12, article 6 of the Payment Services Act, the mentioned amount of authorized capital (head office funds) cannot be reduced during the validity period of the license.

Payment services providers in Singapore are under strict control of MAS (Bočánek, 2020). Thus, according to Clause 1, Article 49 of the Payment Services Act, a payment system operator is obliged to provide MAS with reports in the manner and form established by the administration. The content of reporting documentation is determined in accordance with Article 22 of Payment Services Regulations 2019, No. S810/2019. In particular, an accountable person provides a copy of the board of directors' annual report, the accounting report, and the internal audit report. It is noteworthy that this list is not closed and can be expanded. In case of violation of terms, form, or content of the report, the payment system operator shall be fined in the amount of not more than 250 thousand SGD; in case of a continuous violation, the additional fine shall be of not more than 25 thousand SGD for each day. One of the main objectives of the reports mentioned above is to counteract all sorts of illegal transactions. As the Singapore researchers point out, regulators should mitigate new risks associated with FinTech development to achieve the goals of financial stability and consumer protection (Lin, 2019). This is largely possible through the application of fairly stiff penalties and the issuance of informational messages explaining how payment service providers interact with MAS. MAS also includes issues from specialized regulatory guidelines that provide greater clarity to payment service providers. These include, but are not limited to, Notice PSN02 Prevention of Money Laundering and Countering the Financing of Terrorism – Digital Payment Token Service, and Guidelines to Notice PSN02 on Prevention of Money Laundering and Countering the Financing of Terrorism - Digital Payment Token Service. According to paragraphs 1-4-11 of Guidelines to Notice PSN02 on Prevention of Money Laundering and Countering the Financing of Terrorism - Digital Payment Token Service, the board of directors and management of the payment service provider are responsible for ensuring sound governance and reasonable management and control of money laundering and terrorist financing risks. Specifically, paragraphs 1-4-13 and 1-4-15 of Guidelines to Notice PSN02 set forth the obligation of payment service providers to provide three lines of defense against the use of payment tokens for money laundering and/or terrorist financing purposes.

The first line of defense is the obligation for payment service providers to use technology to detect illegal transactions by a customer and to train personnel to avoid

violating the law when they interact with the customer. It is of interest how a payment service provider should determine the suspiciousness of a transaction. Thus, according to p.6-11-7 of Guidelines to Notice PSN02 on Prevention of Money Laundering and Countering the Financing of Terrorism - Digital Payment Token Service, the payment service provider must take into account the information received from law enforcement and other authorities, pay attention to the size, frequency and structure of transactions, the geographical purpose or origin of the payment, the existence of sanctions against the customer or the recipient of digital payment tokens. This provision eliminates the possibility of sub-sanctioned persons circumventing the restrictions imposed on them through the use of cryptocurrency.

The second line of defense is the implementation of continuous monitoring of compliance with all anti-money laundering and counter-terrorist financing (hereinafter - AML / CTF) obligations, including those related to identifying the customer resorting to the use of digital payment tokens. In the opinion of the author of this paper, the issue of identifying the owner is a key issue in the legalization of cryptocurrency circulation. According to p. 6-5 Guidelines to Notice PSN02 and p. 6.5 of Notice PSN02, clients-legal entities can be identified using publicly available sources or databases (such as company registries, annual reports) reasonable information provided by clients. Information on founders, board members, beneficiaries, and controlling persons is also examined. In accordance with paragraphs 6-5 of the Guidelines to Notice PSN02 and with regard to natural persons, such customers are also identified by providing identification, a photograph, and a verified residential address. According to paragraph 6.45 of Notice PSN02, if the payment service provider cannot meet the measures relating to customer identification, it should not start or continue any business relationship with the customer or perform any transactions to open or maintain an account.

The third line of defense is the payment service provider's obligation to perform an independent internal assessment through an audit of the AML/CTF risk management framework. Paragraph 4-15 of the Guidelines to Notice PSN02 explains what is being assessed. Specifically, it assesses the ability to identify changes in a customer's profile and transactions; determine the potential for misuse of new business initiatives,

products, practices, and services for AML/CTF purposes; balance the use of technological or automated solutions and manual or human processes for AML/CTF risk management purposes; identify the potential for fraud; improve the employees' and officers' awareness of AML/CTF issues; cooperate and coordinate with MAS and law enforcement bodies. When assessing AML/CTF risks, the payment service provider must pay special attention to new products, methods, and technologies concerning the use of digital payment tokens.

### **Singapore's national digital currency**

Singapore has not only regulated the use of blockchain technology by individuals but has also begun to use blockchain technology to create a national digital currency actively. Based on the analysis of the Project Ubin Report: SGD on Distributed Ledger, we can see that in Singapore, the digital Singapore dollar is a special token that is issued one-to-one in exchange for money. Such tokens have a certain area of use, namely the settlement of interbank liabilities, but have no value outside of that area. At the same time, it is possible to exchange these tokens for money and back. MAS explains the benefit of creating this particular type of digital currency because, unlike money in bank accounts, there is no need to pay interest, and the absence of interest settlements reduces the complexity of managing the payment system. In addition, each token is secured by an equivalent amount of Singapore dollars held in accounts, meaning the total money supply does not depend on the issuance of equivalents in a distributed ledger because there is no net increase in dollar claims on the central bank. Also, the digital Singapore dollar is a limited-use instrument that may have additional features to protect against misuse.

As the researchers point out, the tokenized approach used in the Ubin project allows for the natural integration of digital currency with other workflows and functionalities that can be implemented on a multipurpose blockchain platform (Didenko, Zetsche, Arner, & Buckley, 2020). For example, the use of a blockchain system will simplify the calculation of wages, payment for goods, etc. For example, the Project Ubin Phase 5: Enabling Wide Ecosystem Opportunities report indicates the possibility of using the digital Singapore

dollar to pay wages in an automated format. In particular, the use of a digital currency based on smart contracts makes it possible to automatically calculate and transfer salaries according to hours worked for specific job lists. This means faster payment turnaround times from traditional pay at the end of the month to instant wages daily for workers. REICE | 119

Another area is the insurance industry. Mechanisms can be used on a common platform using the digital Singapore dollar to resolve financial claims when predetermined conditions are met. This will lead to faster payments and eliminate the need for reconciliation as transactions will be recorded on the chain, and the platform will act as a single source of verified data for all participants. In this way, a fully integrated insurance process can take place along the chain, providing a more efficient, cheaper, and data-driven insurance process for all participants.

Analysis of the MAS reports also showed that the use of the digital Singapore dollar would allow abandoning such types of transactions as a letter of credit. Letters of credit are relatively cumbersome instruments that can be time-consuming to process and settle. As a rule, the seller will not ship the goods unless the buyer's bank provides a letter of credit guaranteeing payment. However, in order to receive payment, the seller must provide a significant amount of documentation. This leads to the fact that sellers need funding. The payment network built on top of Ubin will simplify the transfer of payments and integrate blockchain-based supply chain solutions in a distributed ledger to facilitate information exchange. In a Purchase to Pay context, this integration automates the entire process, improving overall transaction visibility and efficiency and reducing time and costs.

According to the researchers, "The main benefits of issuing central bank digital currencies are the ability to provide an alternative and universally available legal tender and enable faster more transparent and cheaper cross-border payments. The main disadvantages of issuing digital currencies are the possible disruption of the financial stability of credit institutions, a reduction in their level of liquidity, and the emergence of cyber risks. If we look at the Project Ubin: SGD on Distributed Ledger Report, we can see that MAS highlights slightly different benefits. The main focus is on exploring the

potential of distributed ledger technology to improve international securities transactions as well as cross-border payments and settlement systems. The researchers point out that the implementation of a distributed ledger system will solve many of the issues related to the settlement of interbank payments and securities, bond issues, trade finance, digital identity management, and implementation of “know your customer” scenarios (Opore & Kim, 2020), and the implementation of the Ubin project will provide a higher level of payment service.

Thus, Singapore sees the introduction of digital currencies as a way to change the settlement system. Therefore, the Monetary Authority of Singapore has set itself the goal of developing and implementing a digital currency operating on the blockchain network, taking into account the principles of open architecture, an open connection, and interoperability with other networks in order to ensure ease of integration in these networks for seamless end-to-end transaction processing and support of wholesale interbank and corporate payments. This will create a common infrastructure for international settlements, which will replace the SWIFT system and provide a qualitative breakthrough in interbank cooperation.

Based on the Project Ubin Phase 5: Enabling Wide Ecosystem Opportunities Report by Singapore based on the Quorum blockchain protocol created by J.P. Morgan, has developed and tested a network that enables the issuance of tokens and the movement of currencies using a set of smart contracts. This network has demonstrated in practice the possibility of using it to interact with other blockchains with the Canadian Jasper network. Specifically, these two projects have shown that money issued by a central bank can be successfully transferred over the blockchain network in real-time. In Jasper, digital tokens are created at the beginning of the day and redeemed at the end. At Ubin, banks purchase or redeem digital tokens at any time of the day and can store them on the blockchain overnight. Therefore, it is necessary to refine the blockchain-based system for interbank interaction. However, in general, this does not plead with the advantages and prospects of using the digital Singapore dollar.

## Conclusions

In 2019-2020 Singapore created legislation to regulate the activities of cryptocurrency exchanges and digital token issuers. The adoption of the Payment Services Act made it possible to consolidate the characteristics of payment tokens as a digital representation of value. This step is of great importance since it became possible to distinguish cryptocurrency from other digital financial assets, and, as a result, to regulate not only the investment sphere with the help of cryptocurrency but also to develop leverage on the cryptocurrency futures market. Obviously, investors looking to get protection when dealing with digital payment tokens and their derivatives will choose Singaporean exchanges over those registered in countries that do not recognize the cryptocurrency. As for the rules for regulating the ICO procedure, the application of the legislation on the securities market seems to be fully justified since the tokens issued in this way have all the features of shares or bonds.

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The analysis of the Singapore project Ubin led to a number of conclusions that emphasize the need to develop a draft international agreement that will allow the development of the infrastructure for cross-border payments using digital currencies. In addition, based on the experience of Singapore, the digital currency should be considered not as an official monetary unit but as a unit of account, and it is from this point of view to study the directions of reforming Russian legislation. Another direction is creating a regulatory framework that allows the use of the blockchain network to design a system that allows the transfer of currency and equity securities between financial institutions.

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