LEGAL REGULATION OF THE USE OF DISTRIBUTED LEDGER TECHNOLOGIES IN THE EDUCATION AND ECONOMIC SYSTEM OF SINGAPORE

REGULAÇÃO LEGAL DO USO DE TECNOLOGIAS DE CONTÁBEIS DISTRIBUÍDAS NO SISTEMA EDUCATIVO E ECONÔMICO DE CINGAPURA

REGULACIÓN JURÍDICA DEL USO DE TECNOLOGÍAS DE CONTABILIDAD DISTRIBUIDA EN EL SISTEMA EDUCATIVO Y ECONÓMICO DE SINGAPUR

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ABSTRACT: Singapore is one of the leading countries in the digitalization of education and the use of blockchain technology. Since 2016, Singapore has been implementing the Ubin project to create a national digital currency. The paper aims to analyse legal regulation of the use of distributed ledger technologies in the education system of Singapore. 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. Singapore 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 digitalization of education. The paper concludes that Singapore's experience can be used by other states to shape or modernize their education system.

KEYWORDS: Education. Education system. Digitalization. Digital tokens.

RESUMO: *Cingapura é um dos países líderes na digitalização da educação e no uso da tecnologia blockchain. Desde 2016, Cingapura implementa o projeto Ubin para criar uma moeda digital nacional. O artigo tem como objetivo analisar a regulamentação legal do uso de tecnologias de contabilidade distribuída no sistema educacional de Cingapura. Com base na análise, conclui-se que Cingapura estende as disposições da legislação de valores mobiliários aos tokens digitais, que possuem as características de valores mobiliários ou futuros. Cingapura desenvolveu um conjunto de regras que consagram requisitos para trocas de criptomoedas, o que reduz os riscos de fraude e lavagem de dinheiro usando criptomoedas. O artigo também analisa os relatórios do MAS sobre o desenvolvimento da digitalização da educação de um estado. O artigo conclui que a experiência de Cingapura pode ser usada por outros estados para moldar ou modernizar seu sistema educacional.*

PALAVRAS-CHAVE: *Educação. Sistema educacional. Digitalização. Tokens digitais.*

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***RESUMEN**: Singapur es uno de los países líderes en la digitalización de la educación y el uso de la tecnología blockchain. Desde 2016, Singapur ha estado implementando el proyecto Ubin para crear una moneda digital nacional. El artículo tiene como objetivo analizar la regulación legal del uso de tecnologías de registros distribuidos en el sistema educativo de Singapur. 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. Singapur 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 mediante el uso de criptomonedas. El documento también analiza los informes del MAS sobre el desarrollo de la digitalización de la educación en un estado. El documento concluye que la experiencia de Singapur puede ser utilizada por otros estados para dar forma o modernizar su sistema educativo.*

***PALABRAS CLAVE**: Educación. Sistema educativo. Digitalización. Tokens digitales.*

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 phenomenon of initial coin offering (ICO), which is an innovative way to attract funding (YANO *et al.*, 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; BUCKEY, 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 centre 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 a number of projects in the financial sector.

Singapore is also a leader in the introduction of public digital currencies (NÁÑEZ ALONSO *et al.*, 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 the use of 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 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, and also deals with the problem of modelling 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, 2020).

All of the above makes it necessary to study, interpret and analyse 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.

Methods

Regulation of ICOs in Singapore

Singapore's policy is to become the most favourable 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). In accordance with paragraph 2 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 requirements of the Securities and Futures Act.

Results and discussion

If the ICO is supposed to be public, then, according to Singapore law, this means that their issuer must prepare and register a prospectus; that is, the issuer must fully disclose information about the person who is seeking funding in this way. As the researchers note, in this case, the rules of conduct related to the honest conduct of business will be triggered (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, in the event 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[2]. Thus, in its press release, the department warned 8 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.[3]

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 License (Guideline No. FAA-G01) and Guidelines on License Applications, Representative Notification and Payment of Fees (Guideline No. CMG-G01) Note that if the issuer will be 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, and 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 offence 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 offence where the act is committed partly in Singapore and partly outside Singapore or where the act is committed entirely outside 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.

[2] A Guide to Digital Token Offerings 2017 [digital source]. Available: https://www.mas.gov.sg/regulation/explainers/a-guide-to-digital-token-offerings

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

Cryptocurrency as a digital payment token

Singapore is among the states that have shown the greatest interest in regulating cryptocurrencies (FOSSO WAMBA *et al.*, 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 characteristic 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, and 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 mean of payment for goods or services or a mean 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, as well as 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 due to the fact that such cryptocurrencies have a well-known issuer, which, in addition, cannot issue them without any collateral, because otherwise it risks undermining the financial stability of

the state. In this regard, such cryptocurrencies are essentially nothing more than electronic money or debt securities issued based on blockchain technology.

Another important issue that is addressed in the analyzed law is how to distinguish cryptocurrency as an object circulating in the financial market from other similar virtual currencies. For this purpose, Singapore introduces into the Payment Services Act such a definition as 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 not only the purchase and sale of digital payment tokens for money on a cryptocurrency exchange, but also 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 or use of any digital payment token as a means of payment for 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.

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 [4] 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, 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.

[4] Securities and Exchange Commission v. WJ Howey Co., 60 F. Supp. 440 (S.D. Fla. 1945). Available: https://law.justia.com/cases/federal/district-courts/FSupp/60/440/1968914/

Based on the nature of cryptocurrency, especially Bitcoin, it is extremely difficult to build a model of its legal regulation. Giving cryptocurrency the status of a digital representation of value, and in fact 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 the use of a digital representation of value regime for cryptocurrency requires either the establishment of 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 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 payment institution, license of large payment institution, license for money exchange. The need for one or another license depends on the list of operations, which the organization intends to perform, and is determined in accordance with 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 must be met by an applicant 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) which has its registered office in Singapore and which executive director is a citizen or permanent resident of Singapore. Article 7 (1) of the Payment Services Regulations, however, 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 may be prescribed by MAS. 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 case of application for a license of a large payment institution, the specified requirements are 250 thousand SGD. According to point 12, article 6 of 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 amount of not more than 250 thousand SGD; in case of a continuous violation, additional fine shall be of not more than 25 thousand SGD for each day. One of the main objectives of the above-mentioned reports is to counteract with all sorts of illegal transactions. As the Singapore researchers point out, regulators should mitigate new risks associated with FinTech development, as well as achieve the goals of financial stability and consumer protection (LIN, 2019). This is largely possible not only through the application of fairly stiff penalties, but also through the issuance of informational messages explaining how payment service providers interact with MAS. MAS also include 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 to circumvent 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 the identification of the customer resorting to the use of digital payment tokens. In the opinion of the author of this paper, the issue to identify 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, the identification of clients-legal entities can be performed using publicly available sources or databases (such as company registries, annual reports) or reasonable information provided by clients. Information on founders, board members, beneficiaries and controlling persons is also examined. In accordance with paragraph 6-5 of the Guidelines to Notice PSN02 and regarding 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 actively use blockchain technology to create a national digital currency. 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 by the fact that, 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 *et al.,* 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 on a daily basis for workers.

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 will allow abandoning such type 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 will be integrated with 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, as well as 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, as well as 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 settlement of interbank payments and securities, bond issues, trade finance, digital identity management and implementation of “know your customer” scenarios (OPARE; 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, 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 has 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 thanks to it 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 than those registered in countries that do not recognize cryptocurrency. As for the rules for regulating the ICO procedure, the application of the legislation on the securities market to it seems to be fully justified, since the tokens issued in this way have all the features of shares or bonds.

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 the creation of 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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