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«They say things are happening at the border, but nobody knows which border» (Mark Strand)

Company law during the blockchain revolution. The rise of “CorpTech”

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Abstract: *In recent times we have seen cases where business and corporate needs have required the presence in the same place of a crowd of people made up of many shareholders of a well-known bank. This was necessary so they could vote on a capital increase that would have determined its rescue from bankruptcy. At the same time, in these days, health emergencies require that certain corporate actions (such as the shareholder meetings for the approval of the financial statements or for the election of the corporate boards) take place without the physical presence of the shareholders, who are required to remain distant from each other.*

These two examples show how different historical moments create new needs which, in many cases, must be satisfied by applying “old” rules. Indeed, although new technologies allowing the exercise of voting rights in innovative ways exists, our legal system requires times to regulate these new technologies before they could be largely adopted.

This constant pursuit between the old and the new, whose speed is increasing in today’s globalized world, requires scholars, on the one hand, to contribute to the elaboration of new rules to allow a safe use of the new technologies. On the other, while waiting for new rules to be introduced, scholars have also the important role to interpret and coordinate (when possible) the old rules with the adoption of such new technologies.

Regarding company law, the reference is to DLT and blockchain technologies and their derivatives (tokens and smart contracts). Here, the neologism “CorpTech” has been created to synthesize the new technological solutions which can allow, in theory, a safer and more effective exercise of corporate rights by shareholder.

For example, some scholars have “theorized” the registration of company shares on a public blockchain to make their transfer easier or to make companies’ ownership structure more transparent. Others have suggested to incorporate the rights (or some of them) deriving from the possession of shares within tokens (so-called tokenisation), in order to make their transfer faster, reducing the related formalities. Furthermore, someone else has discussed the possibility of holding shareholders’ meetings at distance, exercising the right to vote through special smart contracts.

Beyond the easy enthusiasm that new technologies inevitably arouse, it is necessary to question the compatibility of the new solutions with the regulations in force in our system. And before that, it is necessary to question the risks and advantages of these new technologies.

Summary: 1. Introduction. – 2. DLT and its derivatives: blockchain, smart contracts and tokens – 3. Representation and circulation of shares and quotas using equity token. Is tokenization of company's participations possible under Italian law? – 3.1 Not "issuing" share to issue equity token. – 3.2 Equity tokens, quotas and the Alternative Regime. – 3.2.1 (How to avoid) the "centralized" figure of the Register of Company. – 3.2.2 A DLT solution in the Alternative Regime. – 4. The exercise of rights through DLT systems. – 4.1 Economic rights. – 4.2. Intervention and voting rights – 4.2.1 Voting rights and DLT. – 4.2.2 Solutions to improve the exercise of intervention rights. – 4.2.3 Technological limits of DLT. – 5. DLT system as solution for personal identification. Perils of deepfake technology. – 6. Conclusion. The CorpTech myth can be concrete?

1. In recent times we have seen cases where business and corporate needs have required the presence in the same place of a crowd of people made up of many shareholders of a well-known bank. This was necessary so they could vote on a capital increase that would have determined its rescue from bankruptcy. At the same time, in these days, health emergencies require that certain corporate actions (such as the shareholder meetings for the approval of the financial statements or for the election of the corporate boards) take place without the physical presence of the shareholders, who are required to remain distant from each other.

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This constant pursuit between the *old* and the *new*, whose speed is increasing in today's globalized world, requires scholars, on the one hand, to contribute to the elaboration of *new* rules to allow a safe use of *new* technologies. On the other, scholars have also the important role of interpreting and coordinating (when possible) the *old* rules with the adoption of such *new* technologies, while waiting for *new* rules to be introduced.

Regarding company law, the reference is to Distributed Ledger Technology (DLT) and its derivatives (blockchain, tokens and smart contracts). Here, the neologism "CorpTech" has been created [1] to synthesize the group of new technological solutions which can allow, in theory, a safer and more effective exercise of corporate rights by shareholders.

For example, Yermack (2016) has theorized the registration of company shares on a public blockchain to make their transfer easier or to make companies' ownership structure more transparent. He has also suggested the incorporation of rights (or some of them) deriving from the possession of shares within tokens (so-called *tokenisation*), in order to make their transfer faster, reducing the related costs and formalities [2]. Van der Elst and Lafarre (2017) have discussed the possibility of holding shareholders' meetings at distance, exercising the right to vote using blockchain [3]. Yermack (2016) has also proposed its use also with reference to corporate elections [4].

Beyond the easy enthusiasm that new technologies inevitably arouse, it is necessary to question the compatibility of this new solutions with the regulations in force. New technologies embody the risk that not everything of what could be theorized can, at the end of the day, become true. This is truer from a legal perspective, considering how high is the number of cases of conflict between "traditional law" and "innovation".

In the following pages the implementation of DLT systems within the whole life of a company would be discussed. In section 2, characteristics of DLT will be described, with a specific focus on blockchain, smart contracts and tokens. Section 3 presents the legal problems of representing company's participations using tokens, dealing with the legal possibility of making the dynamics of purchasing and exchanging shares more efficient through DLT. Section 4 deals about the exercise of

voting and administrative rights through tokens. Here, in addition to provide practical suggestions for the implementation of DLT systems while respecting the current regulation, we will also study their application limits, highlighting how these limits exist more from a technological point of view than from a legal one. Section 5 shows how DLT can solve identification problems during a company meeting. In particular, the section deals about the perils of technologies that can reproduce in real time the face or the voice of a legitimate participants of those meetings (so-called deepfake video) and how blockchain can be the solution against it. Finally, section 6 concludes the paper, discussing in which terms the "myth" of CorpTech can be considered concrete.

2. A discussion on the compatibility between company law and DLT requires a brief recap of the functioning of blockchain, smart contracts and tokens.

To simplify, we define blockchain a derivative of DLT. Blockchain is, indeed, a particular form of DLT and can be described as a system in which information and data are stored using cryptography. The peculiarity of this innovative *database* is its decentralization, that is the fact that this "register" is under the control of a peer-to-peer network of participants. A blockchain database can record the transactions made by the system's participants without the need of a unique and central authority that manage it. DLT allows full disintermediation, since each participant of the network, called "node", possess a full copy of the information stored therein. Decentralization is the first but not the only important characteristic of a blockchain.

The second one is transparency. Indeed, to reach the best level of decentralization there is the need to let everyone became a node of this database. This implies the power given to everyone to see (and make a copy) of the information stored in this register using specific tools.

Decentralization and transparency make the use of a DLT a cyber-secure choice to store information. Indeed, who desires to modify the information stored in the distributed register needs a power that is higher of the 51% of the computational power given by the participants to the system. This means also the approval of (or to attack the PC of) the nodes offering such amount of power.

The innovative functionality of DLT lies in the peculiar kind of *things* that can be stored in its registers. The first one is called *token*. A token is nothing more than a record of information that results in favour of a participant. A token lets his *possessor* (that is the person that has the power to transfer its transcript in favour of another one) to be recognized by the entity who released the token as the holder of a precise amount and/or kind of rights. So, if from a technical point of view, a token is nothing more than a simple registration, from a functional point of view it can be considered as an informatic instrument that lets participants exercise a precise kind of rights towards the releasing company. Those rights are, often, the subject of an offering to the public in exchange of money to develop an entrepreneurial project (Initial Coin Offering or ICO). The rights conferred by a token includes: the simple right to exchange the token itself (*cryptocurrencies*); the access to a service provided by the platform (*utility token*); administrative or economic rights toward the company that offered them (*investment token*). Hence, tokens are adaptable tools which let almost everything to be represented by them (so-called *tokenization* process). They are very useful because they can easily be sent to or exchanged with other participants and, notwithstanding their virtual nature, they do not need intermediary to be custodied or transferred.

Token are created by the blockchain protocols in which they are register or by a *smart contract*. The latter being the last of the DLT derivatives described hereby. Smart contracts were born when some blockchain protocol, such as the Ethereum one, started to use the power of calculation of its participants to run a *virtual machine*. A virtual machine can be imagined as a big (phantom) computer using the power given by all the computer of the participants to elaborate softwares. Therefore, smart contracts are not contracts, but simply algorithmic sequences elaborated by computer created with

the calculation power of the nodes. Being the virtual machine – as every information recorded on the blockchain – under the control of nobody, smart contracts acquire the two following characteristics: unstoppable self-execution and autonomation [5].

As every software, smart contracts are self-executing. If a smart contract is programmed to perform a determined action, it will work until the action is completed. This means also that if a precise mechanism to stop its functioning has not being "programmed" by the party who launched it, nobody can stop its functioning without taking the control of the 51% of all the calculation power alimentering the blockchain.

Autonomation means that smart contracts lack human interaction for their execution. So, above all, they can be used to perform obligations deriving from a real contract that can be written within the smart contract it-self [6]. A contract of this kind could help the managing of a contractual execution since there is no need for interpretation of its terms. At these conditions, parties do not need to trust each other before the conclusion of the agreement since the execution its fully automated. For instance, this principle applies particularly for the collection of money through the launch of an ICO. If the collection of money is managed using a smart contract, this program will automatically deliver the token in exchange of the money received.

In light of all the above considerations, smart contracts can strongly grant the right attached to a specific token. If a token grants the access to a specific service of the issuer, the buyer of the token could be sure that he will enjoy the service he paid for.

To sum up the informatic landscape exposed in brief above, it is possible to describe DLT and its derivatives as follow. Blockchain is the infrastructure on which tokens are placed and interact with other participants using smart contracts without any need for intermediaries.

3. Having described DLT essentials, it possible to see if the law permits those to be exploited by companies.

The first way in which DLT can innovate corporate functioning regards the procedures by which companies shares and quotas are represented and circulates. The possibility for tokens to represent companies' shares (*equity token*) would represent an incredible opportunity for their shareholders. Indeed, they could enjoy the possibility of exercising the rights *tokenized* without any intermediation. Within the list of rights that could be exercised, the first is the possibility to trade the shares acquired. Here the lack of intermediation makes the system less costly and not exposed to third party risk. Practically, each shareholder may exercise on its share the same control he has on a physical object.

Before creating too much expectation on what it is possible to do with an equity token, it is necessary to verify if the law consents its creation. To do so, Italian company law will be taken in consideration, focusing on the rules governing the way companies' shares can be *represented* or can *circulate*.

The results of the proposed analysis will vary on the basis of the *circulatory regime* adopted by the company. Within this paper we will consider just two different circulatory regimes for participations of Companies Limited by Shares (*società per azioni* or *SPA*) [7] and two other regimes for Limited Liability Companies (*società a responsabilità limitata* or *SRL*).

3.1 SPA are the legal structures that suite most the possibility to issue equity token. The procedures regulating creation and circulation of their shares (*azioni*) seems to be adaptable to a DLT ecosystem.

Shares are the result of an abstract division of the company's authorized capital. They can be incorporated in physical documents to facilitate their circulation. In this case, share certificates are issued and it means that shares are incorporated in a physical document (*azioni cartolarizzate*). This

regime of circulation is referred to as *securitization* (*cartolarizzazione*) and it is not mandatory.

In this regime, shares need to be incorporated within a physical "object" to circulate. This fact represents (involuntarily) a formality that can impede the application of a DLT system. Indeed, the difficulty to consider a token as something "physical" seems non compatible with the rules of circulation of nominative shares [8]. Circulation of shares in this regime requires the exchange of something physical. There is strong doubt about the possibility of including in the definition of "physical" a computer program such as a smart contract or, even less, a mere registration such as a token. Indeed, even admitting that the material support on which shares need to be represented can be different from paper, the possibility to consider a token or a smart contract as a "material" support in which shares can be incorporated has been excluded by their "virtual" nature [9]. Therefore, it is very difficult that in this regime, shares could be tokenized.

As anticipated, being this regime not mandatory, pursuant to Article 2346, paragraph 1, of the Italian Civil Code, a company can decide to not incorporate shares in physical documents (*azioni non cartolarizzate*). So, share certificates are not issued and their circulation is controlled only by registrations made by the company in the Shareholder Book.

This second regime appears to be more in favour to the adoption of a DLT system. The transfer of non-securitized shares is effective simply when parties agree on it [10] and their consensus does not even need to be formalized in writing [11]. The transfer needs to be registered in the Shareholder Book and this registration seems to require just specific formalities that are considered not necessary for the transfer to be effective [12].

In this circulatory regime a central role is played by the Shareholder Book kept by the company. This book is very similar to a DLT register and can be kept through informatic tools, according to art. 2215-bis of the Italian Civil Code. Among these tools it is possible to include smart contracts.

In light of the above, we can conclude that adopting this circulatory regime it is possible for a company to issue equity tokens. This is true both from a technical and a legal point of view. In order to do that, after having decided to not issue share (i.e. to not incorporate them in physical documents), the Shareholder Book should be created using a smart contract. Then equity tokens representing company's share can be issued. A shareholder will have to connect with a specific section of the company website to transfer his equity tokens. There he could interact with a smart contract programmed with the task of intermediating the circulation of the equity tokens issued. In doing so, this smart contract (being itself the Shareholder Book) could be updated with the information of the new shareholder to whom shares are transferred.

The solution illustrated seems the only legal possibility for a SPA to distribute to the public crypto-assets *representing* its shares in the form of equity token. However, what is true is that the equity tokens will not *really* represent the shares of the company. Legally speaking, without a specific intervention of the legislator, this system will only let equity tokens to be a tool whose alienation would activate the mechanism for the updating of the Shareholder Book.

3.2 Equity tokens, quotas and the Alternative Regime.

3.2.1 A completely different analysis needs to be done considering Limited Liability Companies.

SRL participations are represented by *quotas*. Differently from shares, quotas cannot be incorporated in physical instruments to facilitate their circulation. They can be transferred as effect of the reaching of the consensus between the parties but, to be effective vis-à-vis third parties, the transfer must be

notified to the Register of Companies. The notification must follow precise and mandatory formalities, requiring the intervention of a specific "intermediary" such as a notary or a chartered accountant.

From this quick overview, two are the major obstacles impeding tokenization of quotas.

First, the role played by the Register of Company cannot be avoided. Without the transcription of the transfer within the Register, circulation of quotas has no external effect. This means that a single quota could potentially be sold to more than one person to the damage of the first acquirer. So, the Register of Company has the important task to avoid double spending problems.

In this regard, someone could say that the implementation of equity token can nullify this danger. Indeed, it is known that DLT systems eliminates the double spending problem and that tokens can be transferred just once, notwithstanding its virtual nature.

However, from a legal point of view, these technological guarantees given by DLT are not enough. This because tokenization of quotas has no effect versus the Register of Company. This is also a consequence of the fact that quotas cannot be securitized. Therefore, the quota-holder resulting from the Register of Company will always maintain the right (and the power) to transfer the quotas he owns. For instance, although a quota-holder gives his equity token to the Person A, he could still sell his quotas, through a public notary, to Person B. Holding the equity token, Person A may be the owner of the transferred quotas only for the "token community", but for the law, after this double-transfer, only Person B is the real quota-holder, being his name the only one resulting from the Register of Company.

The obstacle for Person A to record his purchase on the Register of Company represents the second of the two problems mentioned above. It consists in the fact that the communication did not come from a notary or a chartered accountant. This law provision precludes the possibility of having these communications managed *solely* by a computerized system. Indeed, their presence introduced within the system a certain decree of centralization that is not fully compatible with the characteristic of DLT.

The mentioned problem does not make the creation of technological solutions for quotas tokenization impossible at all, although its implementation could be quite difficult and will require the necessary participation of a notary or of a chartered accountant.

Similarly, to the one described in paragraph 3.1, a solution could consist in the implementation of a smart contract with the task of intermediating equity token. In addition, here the smart contract should also send the communication to the Register of Company. In doing so, the smart contract should *exploit* the authorization of a notary or of a chartered accountant for communicating with the Register. Considering that today those communications are send using electronic tools, it not possible to exclude that a solution of this kind could be adopted without amending any law regulating these aspects of Italian company law, although with the mentioned difficulties.

3.2.2 According to the above example, without a specific reform of Italian Company Law, it is quite difficult (but not impossible, as we have explained) for SRL quotas to be transferred "using" equity tokens.

The difficulties of transferring quotas between parties are known to the Italian legislator. SRL quotas was not regulated to be offered to the public or traded in regulated markets. Notwithstanding this, SRL is still the cheaper legal form for companies and so the most adopted by start-ups. To foster the development of a secondary market for quotas, Italian legislator created in 2015 a new method for transferring them. The so-called *alternative regime* [13] was introduced with the clear intention of favouring the development of a secondary market of a specific "kind" of quotas. These are the ones

distributed following the conclusion of an equity crowdfunding [14] campaign, an alternative financing instrument with the peculiarity of being very illiquid [15]. In that period, the illiquidity of this financing instrument was caused by the difficulties of secondary market for quotas to develop, due to the mentioned inadequacy of quotas to circulate.

The alternative regime for quotas was introduced with art. 100-ter, paragraph 2-bis of Legislative Decree no. 58/1998 (*Testo Unico della Finanza* or TUF) [16]. This article provides a solution to the need of communicate each transfer to the Register of Companies using a notary or a chartered accountant. The solution consists in the participation to the system of an intermediary authorized to provide investment services. Its role is to acquire the shares offered during the equity crowdfunding campaign in the interest of the investors but not in their name. This implies that, after the conclusion of the funding campaign on the equity crowdfunding platform, the intermediary will notify a request for registration to the Register of Companies for all the quotas subscribed by the investors that decided to opt for this circulatory regime. This intermediary will so become the only quota-holder resulting from the Register of Companies although the quotas are held by him but in the interest of each participant to the equity crowdfunding campaign.

For the alternative regime to function, the intermediary is required to keep a register with the information of the quota-holder he is *working* for. This mechanism let quota-holder to transfer their participation through a simple communication to the intermediary. When the communication is received, he will only change the name of the investors contained in its register [17]. In this way, there will be no need to notify each transfer to the Register of Companies, considering that the intermediary is the only quota-holder register therein in the place of the investors.

The alternative regime is less *formal* than the traditional one applicable to participations of SRL. This *informality* makes it possible to be re-created using DLT in order to "issue" equity tokens. The issuance of equity token in this circulatory regime, however, do not depend only by the will of the company. It is, indeed, necessary the participation of the mentioned intermediary. It is him that should adopt a DLT solution to let companies that concluded an equity crowdfunding campaign have their participations be represented by equity tokens.

In this regard, the intermediary is free (as a private entity) to choose the technological systems that he prefers to manage both the receipt of the transfer communications and the same register in which the transfer must be recorded. It is so possible to imagine a solution in which there is an agreement between the intermediary and the company to assign to each new investor a token representative of what is written in its own registers. For instance, as already suggested, it could be imposed to quota-holders that the transfers of equity tokens take place exclusively through the interaction with a smart contract (accessible through a simple website) with the task to keep the register and automatically update the records of each quota-holder.

The result would be the creation of a mechanism that allows the transfer of quotas based on the exchange of tokens on a DLT [18].

4. The potential associated with the use of DLT systems is not limited to the mere representation of company participations. Indeed, it can be extended to the exercise of the rights guaranteed by their possession. Having ascertained the possibility, under certain conditions, of issuing equity tokens, there is the need to assess whether, under current legislation, those tokens can be used to exercise the rights associated with such holdings (economic and voting rights) [19].

4.1 Adopting DLT for the exercise of voting rights does not present problems of compatibility with Italian legislation. The regulation does not prevent shareholders to use DLT systems to request the amount of money they have right to. Nor it prevents companies from distributing the profits generated automatically to their shareholders.

The only laws that a DLT solution should respect are the ones regulating when and which amount of money could be distributed. For instance, article 2433 of Italian Civil Code provides that dividends may be distributed only when profits are really achieved, and they result from an approved balance sheet. If profits are distributed in violation of these rules, the assets distributed can be requested back. Rules of the same tone can be found in bankruptcy law. Here the main scope of the regulation is to avoid the alteration of the so-called *par condicio creditorum*. In brief, when the company enters in a bankruptcy procedure, a precise order should be respected in the division of the remain assets of the company. In addition, specific provisions of bankruptcy law permit, in the interest of creditors, to nullify the effects of money distributions to shareholders, even if the distribution has been made before the bankruptcy declaration.

In light of the above, companies can introduce DLT systems that automatically distributes profits to their shareholders. It will suffice, in fact, to respect the substantive rules governing the conditions for the distribution of sums to shareholders. Indeed, the mentioned rules remind that in some case a company may request back money distributed to shareholders. Its importance it is clearer since mechanisms involving DLT systems are usually irreversible. A company must have clear that automatic distributions of its assets could not be obtained back, not even through the intervention of public authorities.

This means that a system that automatically distributes profits to shareholders could be considered "unlawful" to the extent that the code of the smart contract does not provide for an informatic solution to comply with the mentioned rules. Differently, its implementation may result in the responsibility of the director and of who has received the task of programming the relevant smart contract.

Considering the possibility that a mechanism compliant with those laws has been implemented, a solution for the automatic distribution of profits to shareholder may consist in a smart contract with the task of collecting the countervalue in cryptocurrencies of the profits available for distribution, so that those sums can be made available to shareholders, subject to the condition of obtaining a precise amount of votes. The greatest advantage of a mechanism of this kind would be its independency from the administrative body, which would be deprived of the possibility of materially influencing distributions already decided. Attributing greater powers of control over the actions of the directors means eliminating at the root the need to request the intervention of the Court in the event of a dispute. This is true considering that within the time a judge reaches a decision, the amount of money to which a shareholder might have right could have disappeared.

However, there is a second important aspect that should be taken into due consideration before implementing the discussed solution: the need to create a strong link between what happens on the DLT networks (*on-chain*) and what happens outside (*off-chain*). This link is not provided by the law.

Indeed, a DLT system is not able to manage what "does not exist" on the DLT network. This means that a smart contract cannot control cash flows that are in fiat currency and in a company's bank account. Shareholders may effectively control what a director do with the money of the company only by creating a secure conversion mechanism between *on-chain* assets (e.g., money in a current account) and *off-chain* assets (e.g., a precise cryptocurrency). Otherwise, to foster the automatic right granted to shareholders it will be sufficient to intervene on the mechanism that mediates between the different networks. Corrupting this "bridge" will be as if such system has never been implemented [20].

4.2 Intervention and voting rights.

4.2.1 Great attention must be paid also to the compatibility of DLT applications and the exercise of administrative rights. There is no doubt that exercising voting through electronic means can increase shareholder participation. This is true with reference to companies with a particularly widespread shareholder base or in emergency situations. Electronic voting allows the reduction of the costs that the voters (whether investors, shareholders or members of another corporate body) must bear to exercise the rights they have towards the company. Therefore, it can increase voting participation. The implementation of electronic voting has also important benefits for the company. First, it allows a better recording of the votes received. Secondly, electronic vote simplifies the organization costs related to the physical placement of the voters within the same location, especially when the right to vote is granted to many people.

Notwithstanding these advantages, electronic voting systems can be implemented but not in total freedom. On the one hand, article 2370 of the Italian Civil Code makes possible to participate in shareholders' meetings through "*telecommunication means*" and to "*express the vote by correspondence or electronically*" [21]. From a technological point of view, this rule is deliberately broad when it refers generically to "*means of telecommunications*" or "*voting electronically*". The use of generic terms responds to a precise choice: by not defining which precise electronic means can be used, the company has the possibility to implement the technical solution that from time to time will be more updated and suitable. This is a correct regulatory choice, considering the speed with which new technologies evolve and create new means that allow the interaction of people in real time. It is precisely this sort of "blank proxy" that can allow the implementation of DLT systems for the exercise of voting rights.

As mentioned before, the use of these systems is permitted under one specific condition. Implementation of telecommunications means to participate and vote in the shareholders' meeting must be provided within company's by-laws. Implicitly, shareholders must have accepted this possibility when they decided to be part of the company. Therefore, it is not the "normality" for shareholder meetings to be held at distance. This fact could be explained identifying a certain distrust towards systems over which it is not possible to exercise total control. This is true given the ease with which electronic voting systems can be altered by the majority, by the directors or by the person who owns the technological voting infrastructure. Those system can be also hacked by third parties that may have some evil interest in distorting the voting results.

If the major concern that prevents the spread of remote voting mechanisms is the danger of a fraudulent modification of the voting results, the implementation of a DLT systems would eliminate this risk. The combined use of cryptography and decentralization makes the results of the data processing unalterable. Voting results recorded in a DLT infrastructure cannot be changed. Its inalterability is inherent also to the fact that decentralization makes this system under the control of no-one.

Therefore, a solution for the implementation of voting system using DLT could easily be find out. Voting right could be exercised through a smart contract that, interacting with voting tokens distributed to the shareholders, allow them to express their vote from whatever place they are, granting that the vote is expressed personally by the token holder.

4.2.2 DLT systems could be also implemented to foster the right of participation, that is the possibility to make a statement during the shareholder meeting and having it recorder within its minute.

There are no technological problems in the possibility of implementing a messaging function to deliver a single intervention. This would be recorded in its entirety and without possibility of alteration. In addition, each intervention could be sent together with a time stamp that would ensure when the message is sent and when it is received. This kind of system could be implemented to

require the verbalization of specific interventions or to manage the meeting discussion in real time [22] without any fear that a single intervention could be changed after the meeting [23]. DLT systems could help verbalization operation so to ensure that the intervention of each shareholder in the meeting is not altered during the drafting of the minutes and to avoid disputes on its content.

4.2.3 We have described how a DLT systems could help managing both the right to vote and the right to participate in a shareholder meeting.

However, there is an important issue underlying the implementation of any DLT system in corporate contexts. It concerns the publicity of the information that are recorded within the network; a problem that is related to the specific type of DLT that is adopted by the company.

In particular, the use of DLT *permissionless* [24] will make information recorded available to everybody [25]. This grade of publicity is in contrast with the secrecy instances of some documents formed during a shareholder meeting. Indeed, the minutes of these meetings are not public documents and cannot be transposed within a DLT permissionless without putting at risk company business strategies.

Those problems could not be solved simply with the adoption of *permissioned* DLT. Indeed, its adoption, if on the one hand may solve the mentioned privacy problems, brings to the table other problems. These are related to the difficulty of identifying the subjects that could be entrusted with the role of node on a company level [26].

Privacy problems of DLT *permissionless* could be still solved implementing specific technological solutions. In this regard, it should be enough to introduce a method to encrypt all shareholder's interventions before they are registered on a DLT permissionless. In this way, third parties will not know the content of the company minutes. Only the company or the subjects with an interest in reading the document should have the possibility to decode its content using a password.

However, this solution may still give rise to concerns. These regards who should have the power to have or to give others the password to de-crypt stored information. This, specially, in case of a public control or in case an order of exhibition is made to the company by the Court. Without that password, indeed, those documents would become too much secret and without any possibility to be read.

In order to avoid the introduction of a fully encrypted system (in which information are available only if a password is known), it would be possible to suggest a different solution, adopting a "mixed" system. In order to do so, it would be required to store on the DLT only the encrypted copy of the data exchanged. This would work as a system of *ex post* verification against possible alterations. The solution of making public only the encrypted "trace" of the minutes, would protect company's needs for secrecy while, at the same time, guaranteeing the interested parties from possible alterations of their interventions made during the meeting. Indeed, by applying the same cryptographic function to the result of the vote or to a certain intervention, they will be able to evaluate the conformity between the vote expressed or the intervention sent and what has been recorded within the DLT. In this way DLT transparency would guarantee from alterations of the results of a meeting in the full respect of the company privacy.

5. At the base of the exercise of the administrative rights, there is the need to correctly identify their owners. For this reason, it seems useful to focus on the importance of a correct identification of those entitled to participate in companies meetings (both shareholder or director meetings), especially when they are held using tools that facilitate the remote participation through audio or video conferencing systems.

Usually the possibility of seeing a person or of hearing its voice guarantees a certain level of security in relation to the fact that the person appearing on the screen or whose voice is heard is actually the one holding the power of decision in a given meeting.

Unfortunately, recent technological developments have put the validity of this guarantee to the test. The reference is to technologies, known as "deepfake".

Deepfake softwares make possible to replace, even in real time, one person's face or voice with those of another. Those softwares use artificial intelligence to faithfully reproduce the characters and voice of someone as if he were in front of the camera, even if he is not there in the reality. To do so, it is sufficient to provide the algorithm with images or videos of the person's face to be replaced. Images that today are easily available on the internet or through social media. Uploaded those photos on the software, the system will gain the power to replace the face of the person really present in front of the camera with that of the subject whose data has been collected. The possibility to create not a simple image but completely new video material constitutes a serious danger, less dystopian than one can imagine. This fact leads to rethink the instruments used to participate in a meeting at distance.

Therefore, there is a real need to introduce non-alterable systems that guarantee the identity of a participant. As highlighted, "non alterability" is a guarantee of the adoption of a DLT systems. The dangers of a technology that can reproduce and imitate virtual sounds or images can be contrasted only with the adoption of a technology characterized by creating "objects" that cannot be reproduced.

A solution to the danger of deepfake technology could be the use of a crypto-asset with identifying function. For instance, with reference to board meetings, identification tokens could be given to board members at the time of their election. To be safer, it would be possible to connect the given crypto-asset to its holder memorizing biometrical data to prevent its alienation. In this way, before participating in a meeting, a member of the board could just make his token interact with a smart contract with the role of confirming the possessor identity.

A similar solution could be implemented for identification of participants in a shareholder meeting. This is true with reference to those company with a small shareholder base, in which the solutions described in the paragraph 4.2 cannot be adopted.

The exposed solutions are the only ways, in which it could be possible to create a secure and incorruptible system to ensure that the person who is interacting by phone or video call is the actual holder of the right to vote and speak.

6. Under Italian company law, today CorpTech myth seems not *real* yet. As we have seen, representing company participations through equity tokens is possible, but only under precise circumstances. The exercise of economic and voting rights using DLT systems do not find legal obstacles but only some technological ones that require the company to comply *ex post* with the law (in case of distribution of assets) or to safeguards company privacy (in case of adoption of DLT permissionless). With regards to identification issues, DLT systems provides an effective solution against the perils of deepfake technology.

Analysing the relationship between DLT and the law, we find out the following results. On some occasion we have seen that is the law to impede the introduction of DLT innovations (i.e. representation and transfer of company's participations). On others, it is DLT that is not enough "technological" (i.e. exercise of administrative and voting rights). Finally, in other occasions, DLT helps law enforcement, having the power of solving real problems (i.e. against perils of deepfake technology).

Therefore, CorpTech myth is not too far to be *realized*. However, in order to make the myth concrete, technology (or maybe just people behaviour) need to slightly evolve. For instance, the problems of the missing link between what happen *on* and *off* chain could be solved: or (i) by discovering new technologies that could let upload money of a banking account on a blockchain or (ii) more simply, by the adoption of *Bitcoin* for every day payments.

In conclusion, not always we have to wait the law or the technology to intervene to solve "our" problems. Sometimes, we could just change our habits.

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[1] The term CorpTech seems to be used for the first time in L. Enriques and D. Zetsche, *Corporate technologies and the Tech Nirvana Fallacy*, European Corporate Governance Institute (ECGI) – Law Working Paper No. 457/2019, 2019, p. 9-10 and it has been referred to all technological solution applied to corporate governance systems, not only to those based on DLT.

[2] D. Yermack, *Corporate Governance and Blockchains*. *Review of Finance*, Oxford University Press, 2016, p. 17 ss.

[3] C. Van Der Elst and A. Lafarre, *Bringing the AGM to the 21st Century: Blockchain and Smart Contracting Tech for Shareholder Involvement*. European Corporate Governance Institute (ECGI) – Law Working Paper No. 358/2017, 2017, p. 16-20;

[4] D. Yermack, *supra* note 2, 2016, p. 23-24

[5] Those characteristics make smart contract suitable to be used for the execution of contracts. It is from this fact that they took their name. For more information on the history, functioning and possible applications of smart contract, please see S.L. Furnari, *Validità e caratteristiche degli smart*

contract e possibili usi nel settore bancario finanziario, in E. Corapi and R. Lener, *I diversi settori del fintech*, Padova, 2019, p. 89 – 110. See also F. Sarzana Di S. Ippolito and F. M. Nicotra, *Diritto della Blockchain, Intelligenza Artificiale e IoT*, Milano, 2018, p. 90-114, M. Raskin, *The Law and Legality of Smart Contracts*, in *Georgetown Law Technology Review* 1:304, 2017, p. 306 ss, available at: <https://ssrn.com/abstract=2959166> and K. Werbach and N. Cornell, *Contracts Ex Machina*, in *Duke Law Journal* 67:313, 2017, p. 102 ss. available at: <https://ssrn.com/abstract=2936294>

[6] To highlight their basic functioning, smart contract has been described as “online vending machines”. Indeed, within the blockchain, they appear as *autonomous agents* who perform predetermined actions in response of a precise input. See N. Szabo, *Formalizing and Securing Relationship on Public Networks*, 1997, p. 1

[7] In this paper we will not consider the dematerialization regime, in which the physical document (or just its circulation) is suppressed in favour of communications made by specific intermediaries. Its functioning is very similar to a DLT system. Indeed, the transferring of shares are made possible through the updating of a series of registers kept by the market management company. However, the system works thanks to the inevitable interaction of financial intermediaries (some of them similar to public entities, being their functioning subject to a precise regulation) whose participation is required by the law. This fact makes this system inevitably “centralized” and unsuitable to the adoption of DLT solutions by companies’ will. For more details on the dematerialization regime, please see R. Lener and E. M. Musumeci, *La gestione accentrata di valori mobiliari in Montetitoli*, *Mercati Finanziari*, Giuffrè, 1994, p. 10 ss., and R. Lener, *La «dematerializzazione» dei titoli azionari e il sistema Monte Titoli*, in *Il diritto della banca e borsa. Studi e dibattiti*, Giuffrè, 1989, p. 6 ss..

As already proposed by some scholars, the offer of tokens representing dematerialized shares is abstractly possible, although it will involve a specific decision in this sense of the market management company. Please see P. Lucantoni, *Distributed Ledger Technology e infrastrutture di negoziazione e port-trading*, in R. Lener, *Fintech: Diritto, Tecnologia e Finanza*, Minerva Bancaria, 2018, p. 97 ss; A. Pinna and W. Ruttenberg, *Distributed ledger technologies in securities post-trading. Revolution or evolution?*, *European Central Bank Occasional Paper Series* 172, 2016, p. 1 ss; P. Paech, *Securities, intermediation and the blockchain: an inevitable choice between liquidity and legal certainty?*, in *Uniform Law Review*, 21 (4), 2016, p. 612 ss.

[8] See N. de Luca, *Documentazione crittografica e circolazione della ricchezza assente*, *Rivista di Diritto Civile*, 2020, p. 124.

[9] N. de Luca, *supra* note 8, 2020, p. 110

[10] I. Kutufà, *Azioni non emesse e autonomia nella circolazione*, in *Diritto Commerciale Interno e Internazionale*, G. Giappichelli Editore, Torino, 2013, 13 ss.

[11] N. de Luca, *Circolazione delle azioni e legittimazione dei soci*, in *Diritto Commerciale Interno e Internazionale*, G. Giappichelli Editore, Torino, 2007, p. 283 ss.

[12] On this opinion, please see N. de Luca, *supra* note 8, 2020, p. 127-130.

[13] For further details on the alternative regime, please see N. de Luca, *Crowdfunding e quote «dematerializzate» di s.r.l.? Prime considerazioni (art. 100 ter, 2° co. bis e 2° co. quinquies, t.u.f. introdotti dall’art. 4, 10° co., d. l. 24 gennaio 2015 n. 3, conv. dalla l. 24 marzo 2015 n. 33)*, *NLCC*, 2016, 1.

[14] Equity crowdfunding is an innovative financing instrument that let an entrepreneur to offer shares of its company of the on the market in exchange for money to develop its entrepreneurial project. For further details, please see N. de Luca, S. L. Furnari and A. Gentile, *Equity Crowdfunding*, in

Digesto delle Discipline Civilistiche: Sezione Commerciale, Utet Giuridica, 2017, p. 159-169.

[15] Illiquidity is one of the most relevant risk associated with an equity crowdfunding investment. This is caused by the lack of an appropriate secondary market. For a precise list of pros and cons of equity crowdfunding, please see S. L. Furnari, *Market analysis, economics and success drivers of equity crowdfunding*, in M. G. Colombo and G. Giudici, *Proceedings of the 3rd Entrepreneurial Finance Conference*, 2018, p. 8-9.

[16] Despite the apparent limitation of applicability of this circulatory regime, it seems still useful to analyse its functioning and its possible application to DLT, considering how similar is equity crowdfunding to an ICO. For the possibility to launch an ICO using the legal regime of equity crowdfunding, please see S. L. Furnari, *ICO in Italia: applicabilità della disciplina sull'equity crowdfunding e suoi potenziali benefici*, in R. Lener, *Fintech: Diritto, Tecnologia e Finanza*, Minerva Bancaria, 2018, p. 145

[17] Article 100-ter, paragraph 2-quater, TUF

[18] To be more precise, the token released will not represent a participation of the company. This because, according to article 100-ter, paragraph 2-bis, lett. b), no. 2, TUF, the intermediary can release to participants a mere certificate whose transfer has no effect on the transfer of the property of the quota. For this reason, the token released should be considered just as a part of the communication mechanism that let the intermediary (and only him) to transfer the property of the quotas with the recording on the register he keeps.

[19] See D. Yermack, *Corporate Governance and Blockchain*, in *Review of Finance*, Oxford University Press, e da S. T. Howell, M. Niesser and D. Yermack, *Initial Coin Offerings: Financing Growth with Cryptocurrency Token Sales*, in *Finance Working Paper 564/2018*, European Corporate Governance Institute (ECGI), 2018.

[20] This is a widely known problem that limits blockchain potentiality. For instance, in blockchain applications to food traceability, the linking role between what is *on* and *off* the chain is usually played by certifying agents. While this solution may solve the problem, on the other hand it introduces new intermediaries in a system that professes itself to be disintermediated, not solving another issue consisting in the possible corruption of those intermediaries. Therefore, in those solutions, the traditional *principal-agent* problem is just shifted on other subjects.

[21] For more information, please see R. Lener and A. Tucci, *L'assemblea nelle società di capitali*, Giappichelli, 2000

[22] In this case it will be necessary to choose carefully the DLT most suitable for the concrete needs. This is because each DLT has its own time rules about the recording of information. These rules may require seconds or minutes before votes or interventions are recorded on the database. This is because, like any transaction to be recorded on this infrastructure, all information must be validated by the nodes. The order in which the nodes proceed with the validation depends on the amount of *fee* the person who sends the transaction is willing to pay.

However, nothing prohibits that these problems can be solved using more performant DLT. This is not a *utopia*. In this regard it is sufficient to consider the improvement in terms of speed of recording information that has been made by Ethereum blockchain in respect to Bitcoin. Here, Bitcoin time of 10 minutes for the addition of a new block (i.e. to record a transaction) has been overcome by Ethereum 15 seconds to perform the same activity.

[23] These systems could be implemented thanks to article 2215-bis c.c., already mentioned, which allows to keep company's books electronically.

[24] *Permissionless* DLTs can ensure a higher level of security than *permissioned* DLTs. This is true on the assumption that the more are the nodes, the less is the danger of a takeover of its majority that could alter the information contained therein. In brief, permissionless DLT offer a great level of decentralization. On the other hand, by definition their content is potentially "transparent" and therefore open to public consultation.

[25] For more information with regards to the compatibility between *privacy* and DLT, please see E. Bassan, *Innovazione tecnologica e regolazione nell'Unione Europea. I mercati dell'algoritmo tra concorrenza e protezione dei dati*, in S. Dominelli e G. L. Greco, *I Mercati dei servizi fra regolazione e governance*, Giappichelli, 2019, p. 19-20

[26] As briefly explained in section 2, nodes are those who will have the powers of detention, validation and (potentially) modification of the copy of the register they held. On a company level, it is easy to note that whatever category of subjects will be selected, it is not possible to identify a solution that has not weak points. For instance, in the case in which the holders of the nodes are chosen in all the employees of the company, it is evident how the economic subordination to other company figures involves a serious danger to the independence of the nodes so chosen. A similar problem could arise considering the category of the shareholders. Here the biggest issue concerns the choice on how to divide the "decisional weight" to be given to each node. If, indeed, all shareholders have equal powers in holding the DLT register, it is not difficult to imagine the possibility that the minority, where numerically greater than the majority, could technologically overturn the corporate balance. Similar reasoning, but in the opposite sense, in the event that the majority shareholder also holds the majority of the decision-making power attributed in the possession of the nodes. In this scenario, the majority will be provided with an additional tool to prevail even more easily over the minority. Finally, even the decision to entrust the holding of the nodes to an even wider circle of subjects, i.e. the stakeholders of the company, if on the one hand allows to solve some of the problems raised above, on the other would leave the field open to further uncertainties. The first and most important problem would regard precisely the criteria with which identifying the stakeholders, combining their role (e.g. bondholders, creditors, suppliers) with the existence of the current interest in obtaining access to important and non-public documents that will be chosen to be kept on the DLT register.

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