

**POLITECNICO DI MILANO**

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**Master of Science in Management Engineering**

***“What are Digital Assets and how can they be integrated in the complex NPL’s market?”***

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## Abstract

Nowadays Blockchain Technology and the opportunity to tokenize different type of assets through it: are increasingly adopted and integrated by several organizations both private and public: which unfortunately are moving on an uncertain and evolving field concerning the classification and regulation of Digital Assets so generated, and therefore are approaching this innovative technology on tiptoes.

This analysis has the purpose to explore how the exploitation of a specific token typology (the one proposed by BlockInvest) may positively impact the bank suffering market, namely the NPL's Market (Non-Performing Loans); considering that nowadays, due the pandemic in which we are still living, it is probably one of the most interesting and needy area to which apply this technology.

Being a financial strategic niche for the wellbeing of financial systems and consequentially for the recovery of economic activities deeply affected by the pandemic, in Europe and in particular in Italy. This Market, through which Banks get rid of non-performing assets (which heavily limit their lending capacity), it is distinguished by strong inefficiencies; that could be overcome through the application of Blockchain Technology and in particular with the tokenization process offered by BlockInvest.

This Report is divided as it follows: a first section of literature review that is in turn split in three parts: a first part regarding Digital Asset on Blockchain and their classification, a second one focused on the NPL's Market in Italy and thirdly the analysis of what already exists in the scientific literature concerning the application of NPL's tokenization through Blockchain.

The second section describes the Methodology through which it was attempted to answer the research question; not having found an exhaustive literature about Blockchain application in the NPL's Market.

Finally, the third and last section consists in the Results obtained from this research, that is the analysis of an Italian startup which is engaged in this specific Financial Market niche, providing thanks to its platform a tokenization service for these bank sufferings.

## **Abstract (Italian Version)**

Oggigiorno la tecnologia Blockchain e la possibilità di tokenizzare asset attraverso essa sono sempre più sfruttate da diverse organizzazioni, sia private che pubbliche; che purtroppo però si muovono su un terreno incerto e in divenire per quanto riguarda la classificazione e regolamentazione dei digital asset così creati, e si approciano perciò a questa tecnologia innovativa in punta di piedi.

Questa analisi ha l'obiettivo di indagare come l'utilizzo di una specifica tipologia di token (quella proposta da BlockInvest) possa positivamente impattare sul mercato delle sofferenze bancarie, NPL (Non Performing Loans); considerando che oggi, vista la pandemia in cui tuttora stiamo vivendo, è probabilmente uno degli ambiti più interessanti e bisognosi a cui applicare questa tecnologia.

Essendo una nicchia finanziaria strategica per il benessere dei sistemi finanziari e conseguentemente per la ripresa dell'attività economica profondamente segnata dalla pandemia, in Europa e in particolare in Italia. Questo mercato, attraverso il quale le banche si liberano degli attivi non performanti che ne limitano la capacità creditizia è contraddistinto da profonde inefficienze; che possono essere superate dall'applicazione della tecnologia Blockchain e in particolare con il processo di tokenizzazione offerto da BlockInvest.

Questo Report è così suddiviso come segue: una prima parte di literature review che è a sua volta divisa in tre distinti cluster: un primo cluster riguardante i Digital Asset su Blockchain e la loro classificazione, una seconda sul Mercato degli NPL in Italia ed infine l'analisi di quanto già presente in letteratura a proposito dell'applicazione della tokenizzazione attraverso Blockchain degli NPL.

La seconda parte, tratta invece la Metodologia attraverso la quale si è cercato di rispondere alla domanda di ricerca, non avendo trovato una letteratura esaustiva riguardo all'applicazione della Blockchain nel Mercato NPL.

Infine, la terza e ultima parte consiste nei Risultati ottenuti da tale analisi, ovvero l'analisi di una startup italiana che è impegnata in questa specifica nicchia dei mercati finanziari, offrendo attraverso la sua piattaforma un servizio di tokenizzazione per queste sofferenze bancarie.



## Executive Summary

Nowadays we are living in a time of outstanding proliferation and confusion regarding Digital Assets on Blockchain. Organizations and Governmental institutions are entering in this new technology, no longer just observing this phenomenon as an opportunity, but also as a threat being it of harsh comprehension and control for institutions. Control that in some cases is virtually impossible; or it opens to unprecedented geopolitical scenarios concerning the implementation of Laws pro or against the usage of this technology.

The focus of this analysis is to understand how a specific kind of crypto token could directly contribute to face the economic crisis that unavoidably would follow the health one caused by Covid-19. Specifically, how it could be integrated to mitigate banking sufferings' problem of which we severely suffered after the financial crisis of 2008 and with all likelihood will present itself in the following years to a degree which is not clearly foreseeable yet.

*“The economic downturn will lead to an increase in NPL in the short to medium term. When how much and how will this increase materialize? Probably not in the next few months, during which the shield of payment holidays and public support through the release of state guarantees will largely “freeze” the portfolios, delaying and possibly reducing the flows to NPE. Nevertheless, moratoria will end, and the combined effect of the decrease in revenues and a worsening financial position of many companies will lead to a severe scrutiny of the capability to pay creditors which will turn into an unavoidable reclassification to default of a significant number of counterparties. **The Italian NPL Market, The Calm before the Storm, PWC December 2020**”*

Crisis that unlike the 2008's one, will arise from real economy, but that will have similar consequences, namely the increase of NPLs (Non-Performing-Loans) in Banks' balances.

This report aims to provide an analysis of how Tokenization through a specific Blockchain solution (BlockInvest) could mitigate the effects of NPL. In the light of this objective, this work starts from an analysis and a reading key on two distinguished dimensions: what digital assets on Blockchain are, with an emphasis on financial nature ones, and the origin of NPL's problem and subsequently the characteristics that NPL's market has acquired. Then crypto assets and NPL are jointly investigated with the analysis of a real case: **BlockInvest**.

## Literature Review

### Digital Asset on Blockchain

Firstly, in the crypto asset literature review, it is defined **what digital assets are** and which are their intrinsic characteristics, going through the fundamental concepts of **tokenization** (providing an example related to today's mainstream Art-NFT (Non-Fungible-Token)) and the most adopted standards to tokenize digital assets. (**ERC-20 & ERC-721**).

Moving forward the report focuses on the analysis of three different classifications of Crypto Assets, chosen on purpose in the following order. The first one is a “purely” crypto classification of digital assets “**EBA Framework**”, the second one comes from Financial World “**Barclays Crypto Asset Classification**” and the third one was born as a combination of these two Worlds “**A comprehensive Crypto Asset Taxonomy by Lucerne University**”.

## **EBA Framework**

After providing the definition of Crypto Assets according to EBA (European Banking Authority) each category provided by this Framework is examined: **(Crypto Currencies, Stable Coins, Investment Tokens, and utility Tokens)**

These analyses are sustained by providing definitions and at least an example for each one of these categories, whilst entering in the details of the most important crypto assets: **Bitcoin e Ethereum**. Those are essential to be understood entering in the Blockchain World.

## **Barclays Framework**

This Framework is instead an example of classification which emerged in the financial world, in response to a challenge set by the European Commission in 2018, to define a classification that would better foster innovation.

## **A comprehensive Crypto Asset Taxonomy**

Classifications underlying this Crypto Asset Taxonomy are firstly analyzed:

### **Financial World**

- **CFI** (Classification of Financial Instruments) **by ISO** (International Organization for Standardization)
- **ACTUS** (Algorithmic Contract Types of Unified Standards) by **Ramberts and Mendelowitz**

### **Crypto Asset World**

- **FINMA** (Swiss Financial Market Supervisory Authority)
- **O. et al.** (Oliveira et al.)
- **B. et al.** (Ballandies et al.)
- **MME** Swiss Consulting Firm
- **ITC** (International Token Classification) by **ITSA**
- **TTI** (Token Taxonomy Initiative) by the **EEA**

Finally, this analysis gets into the substance of the Classification, which is a morphological box composed by 14 variables; subsequently comparing it with the previously mentioned classifications; stressing its embedded benefits and the reason why it would be used to map BlockInvest's token.

## NPL's Market Analysis

In the second part of this literature review it is analyzed the NPL's issue which badly influenced Europe and Italy in these last thirteen years, starting from the **definitions** provided by the EBA in defining bad loans positions: **NPE** (Non-Performing-Exposures), **NPL** (Non-Performing-Loans), **UTP** (Unlikely to Pay definition) and **Forborne Exposures**. The discussion gets into the substance of which were, and which will be those **macroeconomics** and systemic factors, that lead Italy to have the negative primacy in the increase and management of NPLs in respect of our European Partners.

*“Over 1.000 billion euro of Non-Performing Loan in Europe, nearly 300 billion euro only in Italy. These are the numbers of a phenomenon which heavily impacted the financial sector in these last ten years. A problem that affected the whole Europe, but mostly Italy, with our Country in the first place among the Continent for the deteriorated credit's volumes. The crisis which impacted the global economy starting from 2007 on it had important repercussions on Italian Banks, regarding the deterioration of credit quality. It is sufficient to think, according to Bank of Italy, the 90% of NPL's flows accounted among 2007 and 2015 in our Country is due to the economic crisis. From an analysis conducted by ABI on the factors impacting the Non-Performing Loans growth between 2007 and 2014 it emerges which were the three main ones, namely: GDP reduction, sovereign debt crisis and finally poor effectiveness of Justice.” As reported in the first lines of the Report: “1 Non-Performing Loan in Italia Trend in atto e prospettive future” published by KPMG in December 2018.*

**GDP** and **Unemployment Rate** of the last thirteen years and their post pandemic foreseeable trends are indeed analyzed; following by the focus on **Competitiveness** in our National System and how it is endangered by pretty sluggish bureaucratic and juridical systems (as clearly empathized by “**Doing Business 2020**” report edited by the **World Bank Group (IBRD IDA)** and published in 2021) and reporting the case of a virtuous Country that through the usage of Blockchain it succeeded in improving its own public administration, **Estonia**.

Furtherly, to conclude this macroeconomic analysis it is pointed out the interdependency existing among the banking sufferings Market and the **Real Estate** one.

It is so derived, considering these factors, that highly likely there will be an increase of NPLs in our National Banking System and so exploiting Blockchain Technology it would be a strategic weapon to tackle this increase; that otherwise would lead to effects tremendously unhealthy for our social and economic fabric for the years ahead.

Once analyzed these past and prospective macroeconomic scenarios, the attention is drawn to the **measures introduced** by European regulators from 2008 onwards to deal with the increase and to avoid the creation of these bad loans.

Consequently, the following reforms and their impact of NPL's stock levels are explained: **Basel Guidelines**, **IFRS 9** Introduction and the institution of new supervisory management, the **ESFS European System of Financial Supervision**, that is in turn composed by these bodies: (**ESRB** (European Systemic Risk Board); **EBA** (European Banking Authority); **EIOPA** (European Insurance and Occupational Pensions Authority); **ESMA** (European Securities and Markets Authority); National Authorities of each Country)

All these introduced measures and governance systems put the Italian Banks under great pressure, forcing them to dispose with significant discounts from 2016 onwards many deteriorated positions; directly impacting on their profitability.

Self-explaining it is the **Monte dei Paschi di Siena** Max Securitization of 2018, in which the group was forced to dispose a portfolio of credits for a GBV (Global Book Value) 24.1 bn€ for just 5.5 bn€, accounting a significant loss in MPS's balance sheet given the 80% discount on the position.

The ESRB given the extraordinary nature of the pandemic situation in which we are still living in it has **momentarily loosen** some of the abovementioned measures and controls to give breath to the real economy.

*"The sustained improvement in the Italian banking sectors' loan quality is set to end, as non-performing loans (NPLs) are expected to rise in the next 12 to 18 months as the expiry of coronavirus-related repayment moratoria triggers an increase in borrower defaults"* as reported **Moody's Investors Service in the report**, published on the 1 of June 2021.

The main drawback that could arise from this suspension it would be a massive soaring of these kind of credits that would clash with a system that is not ready to absorb them.

Given these assumptions Blockchain would be fundamental beneficial in optimizing already existing processes and to enable the NPL's Market to new players, guaranteeing in this way a faster processing of these credits.

The analysis then follows by entering the details of the **Securitization Process**, namely that financial transaction that Banks set up to dispose their NPLs, that could happen in different forms according to the Italian Law: (Synthetic, Revolving, Conduit and Repackaging (CDO)). This process is characterized by a huge **bid-ask gap** among the seller, the Bank originator, and the Investor (Which typically is an Investment Fund); indeed, the impact of following factors is investigated: **Credit recovery time and IRR** (Internal Rate of return), **Information Asymmetries**, **Portfolio Segmentation**, **Balance Sheet Policies** and **GACS**.

This Securitization Process has been massively implemented by banks in the last five years (just with GACS 74.1bn€ GBV NPLs were Securitized starting from 2016); this phenomenon led to the establishment of an NPL's Market with three major players: **Banks**, **Servicers** and **Specialized Investors**.

## **Digital Assets on Blockchain and NPL**

Once introduced the necessary concepts and history both of digital assets and the NPL's Market, this report analyzed whether in the scientific literature already exists some research regarding the application of **Blockchain in the NPL's sphere**. Unfortunately, today it does not exist an exhaustive scientific literature which deeply underlines the usage of Blockchain in the specific NPL fields, but there are some that indirectly do.

Specifically, two papers are worthy to be mentioned:

- *"Application of Blockchain in Asset-Backed Securitization"* published by Meikang Qiu.

*In this paper are deeply analyzed the inefficiencies of the traditional ABS (Asset Backed Securities) process, then the LJR (Lianjiaorong) platform is introduced, which is the first Chinese DLT platform to issue ABS. Finally, this paper underlines*

which are the benefits and advantages that are gained by each agent involved in the Securitization process thanks to the application of this Technology.

- **“Smarter banking: Blockchain technology in the Indian banking”** published by Suparna Dhar and Indranil Bose

In this analysis is firstly introduced the critical situation in which the Indian banking System was in 2015, that similarly to the Italian one was heavily impacted by NPLs. Secondly a brief introduction on Blockchain Technology and Smart Contracts is provided and finally it is illustrated how Blockchain technology could directly support the Loan Origination to consequentially impact the NPL monitoring and then disposal. By providing in this way a “lagging” solution for NPLs, not for those ones already in being.

## Methodology

To fill this underlined gap existing in the literature, this research aims to analyze a real case of Blockchain adoption to solve the NPL issue. The use case selected is the Italian startup: “**BlockInvest**” which is directly providing a concrete functional Blockchain solution to the NPL’s Market. In this section are stated the steps which brought to gather the needed information to conduct such analysis:

- Firstly, the study of information available on its Web Site and LinkedIn Page
- Secondly, the analysis of Online Video Interviews conducted to Lorenzo Rigatti (BlockInvest Founder & CEO)
- Thirdly an interview with Lorenzo Rigatti. The questions were drafted starting from the previously gathered material and were functional to gather information on uncovered topics and entering in the details of some aspect of the Solution

## Results

Firstly, the Company is introduced, stating its Mission, that is to offer a tokenization Service for a variety of **real authentic assets** belonging to different industries; enabling with their Platform a powerful tool to foster **Tokenomics** on large scale. Even though this solution is suitable for a variety of industries; they are currently deploying a **standard to tokenize NPLs**. Given that they are in a startup phase, they strategically chose to address one niche Market, which according to them and according to this analysis (as it clearly emerges in the literature review) it is probably the most valuable one to which apply the concept of tokenization nowadays.

“BlockInvest’s Target Market is the NPL’s one, exceedingly difficult to be entered and managed; but with huge volumes, almost 170 bn€ only in Italy, that are expected to double up due to the pandemic situation. Market which still suffers of numerous bureaucratic inefficiencies as paper documentation, stamps and wide usage of the notary.” As reported **Lorenzo Rigatti, BlockInvest founder**, in the interview conducted on Fintech Advisor YouTube channel and published on the 10 of November 2020

Such Token, generated applying **BlockInvest Technology** to the NPL's Securitization process, it is then framed and analyzed according to the "Comprehensive Crypto Asset Classification" previously introduced, by declining its 14 variables: (Claim structure, Distributed Ledger Technology, Underlying, Ownership, Consensus Mechanism, Legal status, Governance, Information Complexity, Legal Structure, Information interface, Total Supply, Issuance, Redemption, Transferability and Fungibility)

Once illustrated the platform and how it does work in the Tokenization of NPLs, it is explored how it could be a disruptive solution for the NPL's Market and the players involved.

### **Portfolio Creation and Management**

In the "as-is" situation, the securitization process is complex and time consuming. Given that different Loan data formats exist, most of the time they are stored in Banks' ledgers as scanned papers and there is not a unique data tape standard to issue NPL's ABS (Asset Backed Securities). The data tape representing the NPL is set "by scratch" by each originator, this provides an incredible effort for investors to evaluate the NPL's portfolio and to assess its real value out of this evaluation.

BlockInvest provides **a standard data tape**, which automatically can effectively run analysis on the position and accelerate and ease the Due Diligence phase. As matter of fact this standard data tape has been evolving since there is a **Consultation engaged by the European Commission** and currently ongoing to establish this standard.

BlockInvest standard would adjust itself according to the European standard when it will be ultimately established, continuing to be a powerful tool to directly tackle those factors which generate the prominent NPL Market's Bid-Ask Gap:

- **Credit recovery Time and IRR**
- **Information Asymmetries**
- **Portfolio Segmentation with a variety of dimensions, opportunity to set highly customized products**
- **Balance Sheet Policies**

### **Market Accessibility and the Creation of a Brand-New Secondary Market**

NPL's traditional Market is featured by marked **Entry-barriers** and it is targeted only by few specialized players, which make the Market extremely concentrated. (As it is the case of the analyzed **AMCO**). This peculiar situation gives to buyers high bargaining power, making banks significantly discount these credits, significantly enhancing the losses in engaging NPL's disposal.

With BlockInvest solution, enhancing negotiation's transparency, the **onboarding process** is facilitated (it is settled in few clicks) which in turn leads to an **increase in the number of authorized investors**.

This technology would also enable the possibility to onboard **international investors**, which are on one side willing to seek for alternative yields but are on the other side threatened by several potential drawbacks.

Once NPL token is issued, primary investors would have the possibility to exploit the **leverage effect**; partially divesting their NPL's positions, selling them on the secondary market to collect liquidity to continue to invest.

In the light of retail investors this technology allows a true change of paradigm; given that in the “as-is” situation an investor of such kind, to invest in NPLs would necessarily go through an investment fund which typically offers products by gathering different exposures on which the investor have poor information. Kind of a NPL’s Blackbox.

Relying on BlockInvest, investors can pick specific NPL’s positions, overcoming the typical NPL’s investment fund drawbacks:

- **Lack of Transparency and Low Frequency Reporting Activities**
- **Fractionable Ownership**
- **Entry Barriers**
- **Exit Barriers**

### **Time Cost Transparency**

Optimizations of the current Securitization process occur on multiple fronts. In the onboarding phase a fast a **KYC** service to identify the investor is offered by the platform (making the Originator save time and cost in this non-value adding activity).

Furtherly given the presence of a data standard and a set of analytical tools to evaluate the NPL’s position the Investor can save potential high **sunk costs**. Being in this way able to engage more negotiations with Banks, given the reduction of this cost figure.

Always thanks to the standard the Platform can tackle the **fragmented or misleading information flow** problem, which may lead the investor to make on their basis poor assessments.

On top of the Optimization of the already existing Securitization processes, “ex-novo” forms of NPL’s financial recovery may be exploited as it is the case of the **Alternative Financing for UTPs**. Subgroup among deteriorated credits which recovery would be crucial for the reboot of our Economy, and which are perfectly suited to be sold by the platform. As it was analyzed with the **Barolo’s Transaction**, namely the first UTP’s Portfolio Tokenization Case through BlockInvest and in Italy.

To complete this analysis, it is illustrated the **Proof of Concept** that the startup carried on with Credit Agricole; which consisted in the artificial and experimental issue of a 500 mln. € NPL’s Portfolio to 100 accredited investors. Underlying how Managerial (Servicer side) and Investors’ objectives are aligned, the low cost and the speediness of such transaction and finally those factors which lead to the creation of a secondary market.

### **Conclusions**

In ultimate analysis from this report, it clearly emerges how in the next years the issue of NPLs would impact to one degree which is not clearly foreseeable yet the European and the Italian economic recovery after the health, social and economic crisis generated by the Covid-19. Especially four factors are to be kept monitored, to envision the NPL’s surge magnitude; namely: (**Supervisory Capital Controls/ End of Moratorium/ Unlock of Job Dismissals/ Lockdown measures in Autumn**).

Regardless of these mentioned factors, which will surely impact on this complex Market; BlockInvest would provide benefits for all the actors involved in the Securitization process. Moreover, it would reduce the **Bid Ask Gap** that characterizes the Market, by facilitating thanks to its disruptive solution the achievement of a fair price for the NPL's Disposal. By tackling simultaneously all the factors which impact to generate this Gap: (Credit recovery Time and IRR; Information Asymmetries; Portfolio; Balance Sheet Policies.)

It is furtherly underlined the importance of tokenization through Blockchain to precautionary detect the rise of new deteriorated financial exposures, as it emerged from the mentioned Indian Paper: "*Smarter banking: Blockchain technology in the Indian banking*". (**Ex-ante NPL's Tokenization**) Underlying in this manner the flexibility of BlockInvest, that could be both a **leading solution** (by tokenize all Loans) and a **lagging one** (by tokenizing NPLs).

Finally, a comparison among the analysed solution, **BlockInvest, and Blinks** (a Centralised Platform to run NPL's Securitizations) it is made; underlying the advantages that a decentralized platform could provide in a trust-less environment.

## 0. Introduction

### **“What are Digital Assets and how can they be integrated in the complex NPL’s market?”**

This research sets the goal to identify how one of the most prominent technological innovation of these last 20 years, may contribute to solve a plague that characterized the European and Italian Market in the same period, namely: NPL “Non-Performing Loans”. It is significant noticing how the problematic question and the solution, that this research aims to analyse, they raised both from 2007/2008 subprime financial crisis.

This Financial Crisis globally generated mistrust in the entire Financial System and it brought indirectly to the advent of Blockchain with Bitcoin, who was born with the objective to create a decentralized coin independent from a centralised financial system, that demonstrated its weaknesses.

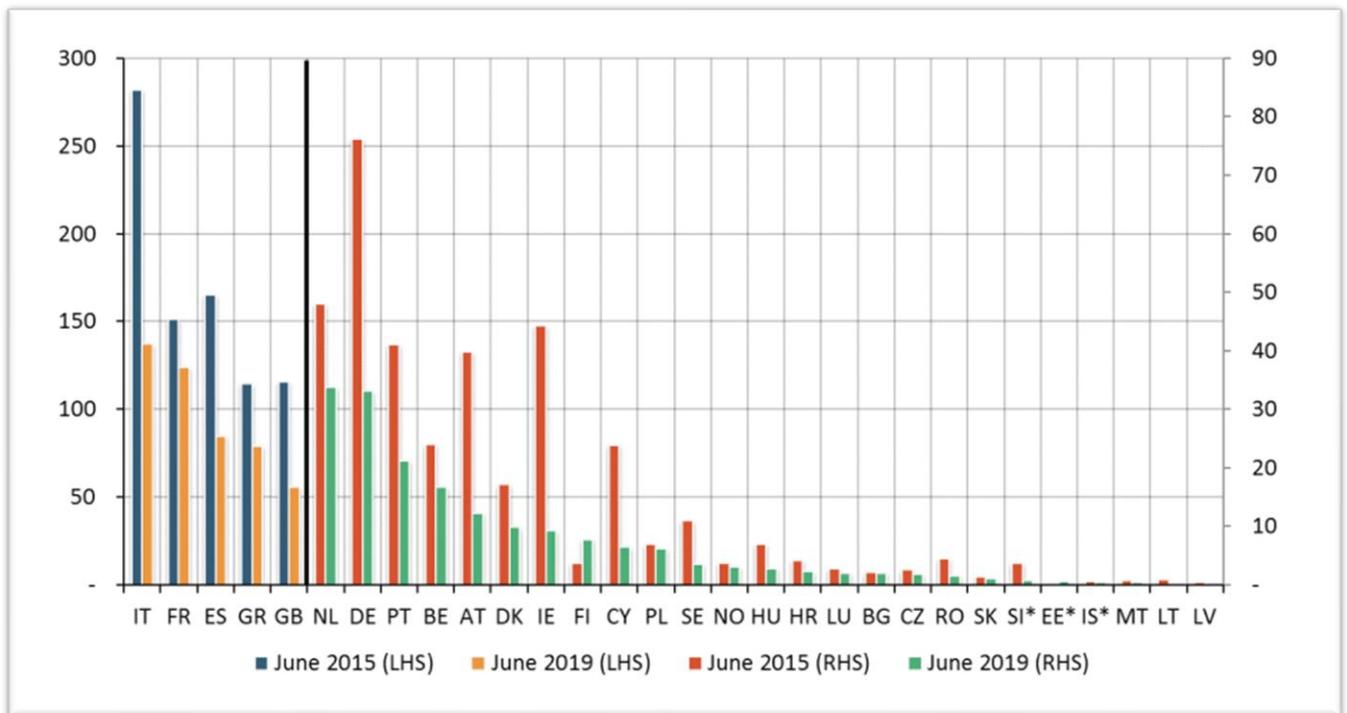
*(Commerce on the Internet has come to rely almost exclusively on financial institutions serving as trusted third parties to process electronic payments. While the system works well enough for most of the transactions, it still suffers from the inherent weaknesses of the trust-based model, Satoshi Nakamoto Bitcoin Paper 2008)*

Damages of this crisis remain nowadays and are explicit in our banking system, despite legislator adopted more cautionary measures to preserve the entire financial system (Basilea II e III, IFRS etc.). Measures that introduced a more sophisticated regulation concerning bank exposures, aiming to reduce and be more effective with the creation of new “Bad exposures”, mitigating them. (Trying to not create new “subprime”, but having little impact for those ones in being)

European banks and above all Italian ones have still in their balances numerous non-performing loans within their assets (at the closing of 2020, they amounted for 130 bn€ in Italian Bank’s Balances), which sensibly reduce their lending capacity (having to shelve significant resources, to balance the elevated risk of default of these credits); despite the fact that from 2015 (year in which NPL reached the maximum peak in the Italian banking system, almost 350 billion euros), thanks to new regulation issued by EBA and the creation of a new market of this NPLs, with specialised players in this business.

The global pandemic situation that nowadays we are suffering, being a black swan, it was not forecasted neither by any legislator neither by any financial institution, it raised and will certainly raise the pressure on this sector. (Having already penalised financial positions in Tourism, Retail and Transportation sectors).

For the Italian banking System, the challenge to increase the efficiency in the NPL market is particularly crucial, being the worst European Nation having reduce its NPL stock originated in 2008 crisis, even before the pandemic situation.



(Source: EBA Report on NPLs – Progress Made and Challenges Ahead published by the EBA on the 8<sup>th</sup> of November 2019)

This substantial difference with the other European countries is undoubtedly dependent on a complex bureaucratic machine, it makes the market of these financial sufferings, much more inefficient than our partners. Inefficiencies in court judgment's time, assessment activities and due diligences.

Blockchain technology combined to political willingness to lighten and simplify processes in managing the so called NPLs, it is the most promising solution to improve this market that has a considerable impact on our Country System. Being the amount of NPLs indirectly proportional to lending capacity and so in ultimate analysis to Firms' capacity to invest and make the economy grow again.

## 1. Literature Review

This literature review's aim is dual; from one side this report wants to give the reader the required information to understand what digital asset on blockchain are and how they differ among each other. On the other side the objective is to introduce the NPL Market, how it has been generated from 2008 financial crisis, which are the macro factors that contributed to fuel their growth, how it is structured, and which are the challenges and opportunities for the future.

### 1.1. Digital asset on Blockchain

Every day we hear about digital asset or token on Blockchain and most of the time we tend to identify them merely as "digital money", but e-money is just a little part of this whole.

Understanding what digital assets are and what are the key characteristics which define a classification of them is of fundamental priority, approaching the Blockchain World.

This is particularly relevant for legislators, that are called to understand and somehow regulate this technology; for Enterprises that are willing to integrate them in their business processes and for investors that want to build a portfolio of digital assets, to diversify their investment and so to capitalize from their embedded differences and risks.

Unfortunately, to date, it does not exist a shared and unique classification of these new digital instruments at a global level. This makes hard the adoption and the usage from Enterprises to Institutions, which approaching them are moving on a slippery ground, both technologically and legally.

For this reason, it is of fundamental priority to rely on an as much clear and comprehensive classification which do not depend on specific protocols and technologies and therefore having a great level of abstraction.

#### 1.1.1. Digital Assets Traits

First here we point out which are the essential features to define a digital asset (regardless of Blockchain Technology), as such:

1. **Valuable**, the token must have a value within or outside the Blockchain. Value on a specific Market, on a specific net to access a service and so forth.

2. **Representative**, it must stand for the property right on a tangible or intangible asset. It could be the representation of a Real Estate Asset, but also of a patent.

3. **Discrete**, it must exist in a countable quantity.

4. **Authentic**, the protocol and technology underlying the asset must guarantee the uniqueness of a given asset. To avoid malicious behaviour by duplicating them.

5. **Digital**, as its intrinsic existence whether on a Distributed Ledger Technology or not.

#### **Digi Cash (an example of Digital Asset before Blockchain)**

Digi Cash was one of the first Companies which has developed the concept of digital asset and put it in place, more precisely with its e-money: “cyberbuck”. Coin, with digital asset’s characteristics above-mentioned, active during the decade from 1989 to 1998.

It was a predecessor of Bitcoin interesting to mention, because as it, it leveraged cryptographic benefits, guaranteeing in this way anonymity in transactions: as it is detailed in: “*Blind Signatures for Untraceable Payments*” paper of 1982 in which the founder, Chaum, theorized for the first time his cryptographic payment system.

Unlike bitcoin this payment model still required the usage of Banks as authenticators of transactions, hence having to go through their will to widespread it.

Despite Digi Cash established key Commercial Partnership with Financial Institutions, the project in 1989 felt through. Among the reasons of this failure, there were two of them outstanding. The challenging mass adoption both from Merchants and Consumers’ sides, that needed to be supported by a tremendous marketing effort. And the missed establishment of crucial Partnerships with Microsoft and Netscape to spread Digi Cash’s software, necessary to process cyberbuck’s transactions.

#### **1.1.2. Tokenization (from “analogical” to digital assets)**

The transition from physical to digital asset it is called tokenization and it allows the application of fractional ownership, that otherwise would be too much complex and costly to be implemented in some real-world cases. Being necessary an increase in the number of fields in different centralized databases and so a further effort for the reconciliation of them on different private ledgers.

Thanks to tokenization it is possible to increase the liquidity of traditional non liquid assets and so to potentially create brand new markets. This is particularly true for: non-listed shares, real estate, and private equity. (Particularly interesting within the Italian scenario is the case of BlockInvest an initiative which aims to turn liquid the extremely illiquid Market of NPLs, as we will analysis further on in this Report).

Furtherly the Tokenization allowed on Blockchain Technology would leave room for the optimization of the so-called Securitization process; that nowadays it happens on centralized IT systems or worst, first on paper and then scanned and imported as images on different IT system, tremendously expanding the complexity of Securitization Management.

## Tokenization in the Art Industry

Today tokenization in the Art Field is a major topic and both Blockchain and Art's industry participants are wondering whether it is just short-term speculation or whether it will be a significant trend in the Art's market in the future.

"Every day the first 5.000 days" was bid in auction, on the 11 March 2021, by the well-known Art Auction house: Christies; It is the most costly and famous NFT sold till nowadays, for an amount of almost 70 million dollars paid in Ether by the anonymous crypto tycoon "Metakovan".



This event triggered the creation of a niche within the art industry, onboarding both new kind of brand-new digital art pieces and the tokenization of already existing once. As recently happened with the sale of the art collection "Andy Warhol: Made Machine", again out by the world leader, Christies. Five artworks by the renowned artist, that were restored from a floppy disk dated 1985, which were born as artistic experiments of the artist with his first personal computer Commodore's Amiga 1000 of which became Ambassador.

Iconic and extreme is the case of the "forever" digitalized Banksy's silkscreen, "Banksy – Morons (White) – 2006", which was bought for 95.000\$ by the group "Injective Protocol". Whom first created the token and then burnt on camera the real artwork, publishing the video online through their twitter account: "Burnt.Banksy"; making out of it a profit of almost 320.000\$. Even though this is not the first case in the history in which the destruction of an artwork become itself an artwork, this episode raised concerns about the danger of this technique that could be replicated in large scale raising speculation, subtracting the priceless opportunity to enjoy certain masterpieces as they were created.

## ERC-20 & ERC-721 (Nowadays' major standards used for tokens)

ERC stands for "Ethereum Request for Comment" and it is a set of standards which are embedded in the Ethereum Blockchain. Operating with a standard, to issue new tokens, it is crucial to guarantee compatibility among different wallets and exchanges. Before the mass adoption of this standard, each token had its unique smart contract; a huge effort was indeed needed to integrate each brand-new token to all the existing wallets and exchanges.

ERC-20 is largely used nowadays for fungible tokens, being it the first type of such standard type.

Tokens within this standard benefit of the following properties: it is possible to transfer them among different wallets, they could be valuable and used to pay services and every token of a specific kind is equivalent to each other.

To issue an ERC-20 token 6 mandatory methods are needed plus 3 optional ones.

Mandatory methods:

- **Total Supply**, the maximum number of tokens that a smart contract can create.
- **BalanceOf**, how many tokens a given address has.
- **Transfer** takes several tokens from the total supply to a user.
- **Transfer-from**, it can be used to transfer token between any given pair of users.
- **Approve**, it verifies if a certain amount could be transfer from the total Supply to a certain user.
- **Allowance**, it verifies if a user has enough token to transact a certain number of tokens.

ERC-721 is instead the standard adopted for Non-Fungible Tokens, it shares with this first introduced category the property of transferability among wallets, they are valuable but are not used to pay for services and finally each token is unique, and it is not fractionable.

Having this ERC standard available is a huge advantage both for Exchanges and Wallets, which do not need to adopt their code for any new issued security token but relying on this standard can easily manage unique and different in nature asset in the same platform.

Thanks to this standard, numerous solutions to integrate different ledgers have been carried out. Ubitquity is an example in the "Title Management" industry (Real Estate, Government Document Recordation & Record Keeping, Escrow ...), it is in fact an API which offers a suited parallel track record for Titles by hashing each property Transaction in a Blockchain. Offering all the advantages of the Technology: Security, Immutability, Automation without improving organizational workflow.

### **1.1.3. Digital Asset Classifications**

As abovementioned, in these years the Blockchain World has been having a proliferation of different Taxonomies, which try to cluster these assets under different variables and perspective.

The first Taxonomy that I want to present it is the EBA's one, in which are underlined the main characteristics of crypto assets that are shared in almost all the relevant classifications existing nowadays; deliberately developed without entering in the detail of specific technologies and processes to leave room for not already existing tokens to enter such a classification.

#### **1.1.3.1. EBA Framework**

##### **Introduction**

The European Bank Authority a few years ago started to raise concerns about crypto tokens, whether it was to be regulated on its own or regulated as traditional financial securities.

These questions strongly emerged in 2017, year in which several ICO (Initial Coin Offering) were carried on; part of them were a genuine attempt to sustain new projects in a more transparent and direct way given the nature of the DLT. Unfortunately, a significant amount of them were scams or securities, disguised under the "mask" of crypto assets, to avoid regulation and taxation which is subjected to those kinds of instruments.

According to a study conducted by "Statis Group" a consultancy Firm (more details), reported that more than 80% of the ICO conducted in 2017 were frauds, but fortunately they collected just the 11% of the 12 billion dollars raised by all the ICO in 2017.

The most significant scam's tokens by funds raised were: Pinchin, 660 million \$; Arisebank 600 million \$; e Savedroid 50 million \$. We can still navigate on Pinchin's website and see their overwhelming promises: "48% return per month plus commission gained for every new user onboarded on the network" and their unclear mission: "The PIN Project is about building an online collaborative consumption platform for global community, based on principles of Sharing Economy, Blockchain Technology, and Crypto Currency".

This massive growth of new issued tokens from 2017 on (5.6 bn \$ in 2017 and more than 22 bn \$ in 2018, as emerged from Bloomberg's article "*How Much Have ICOs Raised in 2018? Depends on Who You Ask*") plus the advent in popularity of Stablecoins, urged EBA's research of a clear definition and taxonomy of crypto assets. That today with the significant deployment of the DEFI (Decentralized Finance) is more necessary than ever.

##### **EBA Definition of crypto asset:**

"An asset is classified as Crypto if it is compliant to the following requisites:

- a) it depends primarily on cryptography and DLT or similar technology as part of its perceived or inherent value
- b) it is neither issued nor guaranteed by a central bank or public authority

c) it can be used as a means of exchange and/or for investment purposes and/or to access a good or service.

**Report with advice for the European Commission, on crypto-assets** by EBA published on the 9 January 2019”

### 1.1.3.1.1. Crypto Currencies vs. Tokens

This is the first main distinction according to EBA's classification; on one hand we have Crypto Currencies, which were designed originally as mean of payment and on the other hand Tokens, which represents the ownership of something whether it exists on or outside the DLT.

COINS	TOKENS
CRYPTO-CURRENCIES	INVESTMENT-TOKENS
STABLE-COINS	UTILITY-TOKENS

#### 1.1.3.1.1.1. Crypto Currencies (Bitcoin and its Monetary Policy)

On the 31 of October 2008 Satoshi Nakamoto published the "Bitcoin Paper", creating simultaneously the concept of Blockchain and the first typology of crypto asset, a payment-coin, namely Bitcoin. By integrating together Cryptography, Proof of Work and Decentralized Networks, to obtain a digital and decentralized digital alternative to government-issued legal tender, in response to the financial crisis of 2008 generated by "Untrusted" centralised financial institutions.

This first category of digital assets gathers all of them which are considered "digital money" and as money, they have the characteristic to be at the same time: a mean of exchange, a store of value and a unit of account.

Likewise, all the other traditional fiat currencies, also crypto ones cannot reach at the same time the perfection of the three abovementioned dimensions, it exists a trade-off among them.

As a mean of exchange crypto currencies are better than fiat ones, under each feature of this dimension:

- **Durability:** ones they have been created, they exist for an undetermined time, they are not exposed as paper currency to wear risk.
- **Transportability:** they can be rapidly transferred online with practical no restrictions. Even, governments have poor instruments to block them. (Bitcoin's private key could be potentially hide and transferred in an infinite way, this feature is and will raise lot of concerns for all the governments around the World)
- **Divisibility:** they are fractionable, 1 Bitcoin can for instance be split with by  $10^8$  times; this single fraction it is called "Satoshi", as BTC's founder.
- **Fungibility:** they are interchangeable, one given crypto currency has the same value of another one.
- **Non-Counterfeit:** it is virtually impossible to counterfeit a cryptocurrency, thanks to its cryptography protocols.

Today is impossible to tell whether cryptocurrencies are good value reserve or not, because their history is still an embryonal one, made by an extremely high price volatility. Even though there are some mainstream models which try to forecast somehow the price of this crypto coin.

One above all it is the popular Stock to flow Model published by the Twitter account “Plan B(TC)”, that from 2018 has been showing good results, in general terms a Stock to Flow Model is applied to Goods characterized from scarcity, comparing Stock (the amount available to date of this good) with the Flow (the production of that good in a defined time frame). The S/F ratio indeed defines the necessary time frame to produce the quantity outstanding in that analysed moment of such good; in this way the longer is time frame, the higher is the price and vice versa.

In the Bitcoin specific case it is known by definition that the Stock of Coins grows at a decreasing pace until reaching the maximum value of 21.000.000 BTC. (Threshold valued defined by Bitcoin protocol) while the mining rate decreases due to the halving mechanism (already abovementioned).



(Source: PlanB – Twitter)

Also, as unit of account, crypto are still too much unstable to be used as a benchmark for products and services. Just like it happens to currencies belonging to Countries with high inflation rates, where national money it is no longer used to purchase product and services, but foreign currencies are used or even in worst case there is a going back to a “barter economy”.

In several Countries of the African Continent, like for instance: “Uganda, Malawi, Zimbabwe, etc.” Cryptocurrencies (mostly Bitcoins) have already substituted National currencies not only for hyper inflationary reasons. The widespread absence of bank institutions, the ease of transferring bitcoin from abroad (compared to the hurdles of traditional services in terms of time and commission), the vast diffusion of smartphones in the continent and so on so forth.

## Bitcoin Monetary Policy

Just like Bitcoin transactions are public and transparent, thanks to the decentralized nature of blockchain and the underlined open-source protocols, also Monetary Policy is transparent.

Money supply is fixed, the protocol establishes that just 21 million Bitcoins will exist (today we are almost at 19 million), this means that new Bitcoins will be “issued” with a more and more decreasing rate as we approach this limit. For “issuing” new Bitcoin it is meant those bitcoins that are generated as a reward for the validator node who has won the proof of work and has spent a significant amount of energy to do it. Today for each validated block, the prize is 6.25 BTC; this remuneration is periodically halved (next halving will be in 2024) guaranteeing a low level of “Liquidity Injection” to maintain its scarce nature.

This is a trait that over time will lead to encourage Bitcoin adoption as a store of value, given the embedded “scarce” nature. Unfortunately, this is not enough; this trend must be sustained by a stabilization of BTC demand, for which regulators’ actions would be tremendously impacting in the future.

Bitcoin as a medium of Exchange:

- **Durability:** Bitcoin is by nature practically timeless, to destroy even just one of them one should destroy simultaneously a net of hundreds of thousands of computers on which the same amount of the entire blockchain copies exist.
- **Transportability:** The time to perform and receive the feedback of a successful transaction is almost 10 minutes. This is not an ideal time for transactions that need to be fast, for instance in-store merchants’ transactions. To this extent further cryptocurrencies are available, like for instance Litecoin.
- **Divisibility:** It is fractionable, 1 Bitcoin can for instance be split  $10^8$  times, the single fraction it is called Satoshi.
- **Fungibility:** Each BTC is equal to another one in terms of value and can be exchanged for product and services. It is the most fungible crypto, given the supremacy of its capitalization.
- **Non-Counterfeit:** It is technological impossible to create a counterfeit copy of bitcoin, given that it could be created only with the validation mechanism.

### 1.1.1.2) Stable Coins

Volatility of “non-backed” Cryptocurrencies, which price is purely determined by matching demand and offer, has given rise to the creation of the so called “stable-coins”.

Stable coins are a peculiar form of crypto currencies that are born to address the intrinsic problem of their price volatility (at least in the short term). These coins’ value is related to one or more underlined assets with a notorious price stability, that are used as collateral.

They differentiate according to the different typology of collaterals:

- **Fiat-Backed-Tokens**, examples: Tether, USDT; USDC, USD-Coin; Paxos, PAX.
- **Commodity-Backed-Tokens**, examples: Digix Gold Token, DGX; Tether Gold, XAUT.
- **Crypto-Backed-Tokens**, example: DAI.
- **Basket-Weighted-Backed-Tokens**, example: Libra.

### EIB’s pioneer bond issuance on Ethereum Blockchain

On the 28 of April 2021, the European Investment Bank launched its first experiment of a bond issued on a Public Blockchain, with a value of 100 million € for a life span of 2 years with an interest of -0.601% per year. Bond underwriters were big financial players such as: Societe Generale, Santander e Goldman Sachs.

This bond was issued on Ethereum Blockchain, and its corresponding payment was sustained through a CBDC, released on the same public Blockchain, and managed and backed by Bank of France. (First Case as well, of a Stable Coin with a value in euros, guaranteed by a national authority)

This is a clear signal of interest by Capital Markets in adopting this technology, to optimize the expensive and inefficient process of the “old” financial World; being the technology able to become a real game changer of this Industry, as defined by Richard Teichmeister (head of funding, new products, and special transactions at the EIB) at Reuters after the project launch.

### **1.1.3.1.2. Investment Tokens vs. Utility Tokens**

As we have two main categories of crypto currencies, so we have two main categories of Tokens: Investment ones, which are like traditional financial securities and Utility ones, which give the right to access a peculiar product or service within a Blockchain platform. This is a fundamental distinction from the juridical point of view, since in the first case, if any profit arises from the sell and buy activity of these assets or any kind of dividend is paid, one should pay taxes on them according to its national tax rules.

#### **1.1.3.1.2.1. Investment Tokens**

An investment token or also called Security token is nothing more than the digital representation of an underlined asset, from which future profits are expected, crucial difference in respect to a Utility one. These tokens share the same key characteristics of traditional securities: fungibility, negotiability and monetary value.

#### **The Howey Test**

The line among these two categories (Utility and Investment) is sometimes blurred, as it happened with a lot of ICOs in 2018. A proxy, which is applied by the SEC (Security Exchange Commission) is to put in place the “Howey Test”; which is a test rooted back in 1946, born to evaluate whether a transaction is an investment or not.

If the following requirements are met, then the token under consideration is a security one.

Requirements:

- It is an investment of money or similar liquid assets. (ICO have generally been conducted exchanging traditional fiat currencies or for cryptocurrencies which are traded in exchanges for fiat ones; so, at the of the day are valuable as traditional money)
- It is an investment in a common enterprise. (Statement that is broadly suitable in all token issuing, given they decentralised nature.)
- There is the expectation of profit.
- Profits are derived from the efforts of others. (The work of developers or other third parties and are not in control of the investor).

Underlined assets for which they stand for could be both intangible (shares, bonds, patents and so on and so forth) and tangible (physical goods, ...). Given tangible assets we have the concept of “digital twins”, that is the coexistence among real assets and tokens. This concept is especially important in the Supply Chain World, where applying sophisticated tracking technologies (as for instance RFID) to products it is possible to develop blockchain solutions to optimize old processes and create innovative solutions, integrate Blockchain to IoT.

For some real assets it emerges the problem of the Oracles, namely *“How is it possible to create a trusty bridge between the external World and the Blockchain?”*.

## Synthetic

Synthetic is a platform for the generation and trading of digital financial decentralized instruments, the so-called Synth. These are synthetic assets, which reflect the behaviour of the underlined ones on financial markets. The advantage of operating with these digitalized financial products is the automatization of data-management, the decrease of transaction costs given that no active managerial control is needed.

The reference token of this platform is called SNX and its major role it is to guarantee a pool of collateral for the entire system.

SNX is basically considered as a collateral that serves to inject Liquidity in the system and to face counterparty risk. The collateralization must be higher than 750% of the traded assets. Users are incentivized to supply SNXs to the system, since they gain both from small trading commissions, almost 0.3% on transactions and an interest proportional to the amount of SNXs staked.

SNX could be exchanged in anytime on a DEX, currently its capitalization is more than 1.9 billion € and its price is currently 16.5€ (13.04.2021 Data)

Let's Howey Test SNX token to understand whether it is a Utility or a Security one:

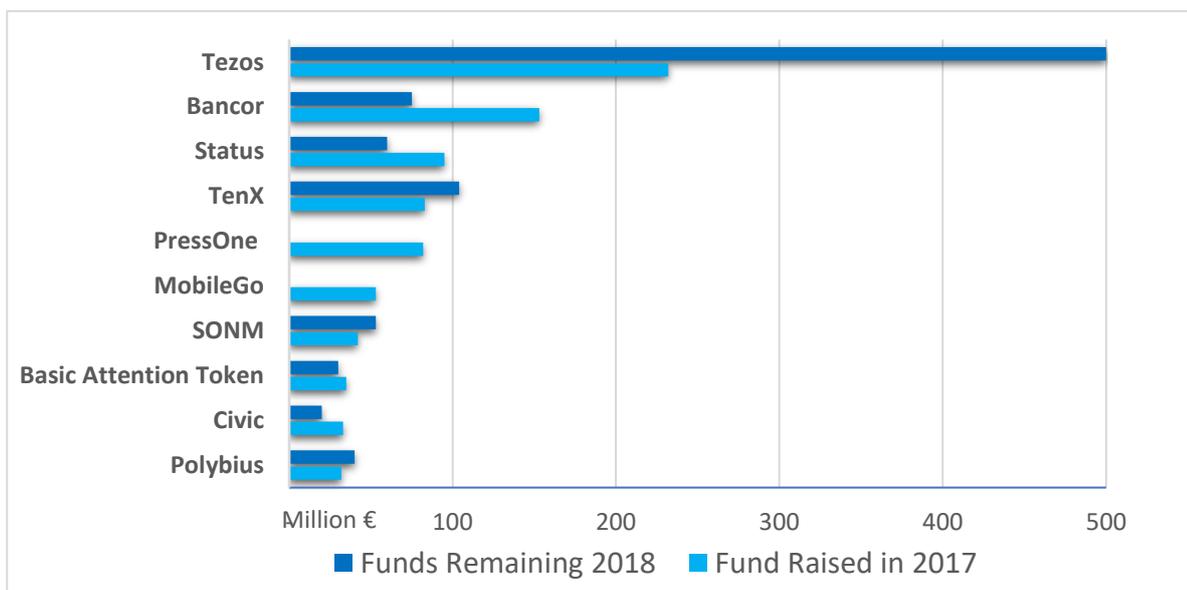
- It is an investment of money or similar liquid assets. (Yes, to obtain SNW you should buy on a crypto exchange, such as: Crypto.com, Coinbase, Binance etc.)
- It is an investment in a common enterprise. (Yes, it is a public platform of traders in which each investor has its own share according to the amount of SNX owned)
- There is the expectation of profit. (Yes, both by the Staking process, the premium for giving liquidity to the exchange and from trading activities).
- Profits are derived from the efforts of others. (Yes, they are proportionally to the trading volumes and dependent on the management efforts of onboarding new users)

### 1.1.3.1.2.2. Utility Tokens

Utility tokens are those kind of digital assets thanks to whom is possible to finance specific Blockchain projects and to have as a return the right to access to services and products on a Blockchain environment.

The financing of these projects is called ICO (Initial Coin Offering), where developers of a project offer to the crowd a limited number of tokens, whose price could be fixed or determined by the quantity of investors that subscribe the offer. The success of an ICO is not proportional just to the number of underwriters (as it happens for IPOs), but also accordingly to a high degree of dispersion, in other terms a decentralization measure.

2017 was a particularly “hot” season for ICOs, more than 800 ICOs were issued for a total of 20 bn\$, phenomenon that was in detail analysed by the renowned journal Forbes: “Where Did the Money Go? Inside the Big Crypto ICOs published on the 29 of October 2018”. By conducting a deep analysis on the main 10 ones per collected funds. Pointing out scams and failures of some of them, due to the misbehaviour of some issuer, that was possible due to the absence of regulations and control of the crypto world; but at the same time highlighting the overall economic convenience and solidity of these projects. As a matter of fact, given an equally initial investment in each of the 10 most capitalized 2017 issued token an investor would have made + 60 % of return in 1 Year. (Despite six out of ten projects analysed had negative returns in the same period)



(Source: Where Did The Money Go? Inside the Big Crypto ICOs of 2017 -Forbes, published on the 29<sup>th</sup> of October 2018)

## Platform Coins (Ethereum)

This is the major subcategory of Utility Assets, which enables the creation of self-sustained decentralized ecosystems. Undoubtedly Ether, with its Blockchain, is the reference coin for this category. It was theorized in 2013 by Vitalik Buterin and then brought to life in 2014.

Ethereum was the first “Turing -complete” Blockchain of the history, in other words it means that on this kind of net is possible to run any given kind of computation. This allowed the creation of D-Apps, decentralized application based on this Blockchain and so of its fundamental token, the Ether. Coin that is fundamental to incentivize users to provide computational power to the “super decentralize computer” Ethereum. No longer only simple transactions are made possible in a decentralized fashion, but also the construction of a real decentralized financial world: “DEFI (Decentralized Finance)”.

Ether is considered a utility token, because of its embedded concept of smart contracts on which it is possible to build such decentralized environment

## Smart contracts

A smart contract is a contractual agreement that is written down and implemented by using a specific software. This implies the two key characteristics of these kind of contracts: self-enforceability and self-execution, that are displayed automatically when certain code verifiable conditions are met, without any human assistance.

They are scripts, which answer to the simple logic: “if-this-then-that” being run on a decentralized ledger; and so, maintaining their functioning totally transparent and immutable. Legal disputes are unfeasible, because of the incontrovertible and unstoppable nature of the code.

Potential use cases of this token class are infinite, since they could be applied to a variety of different “data-driven” businesses to automate several processes. Furtherly this also gives the opportunity to build complete decentralized organization, as it was the case of DAO.

The main drawback of this type of contract is that they are uneasy to understand by a non-programmer and for this reason some parties in various industry could be sceptical. One possible solution to address this problem could be “Ricardian Contracts”, a method to translate “human language” contracts into code. (Solution already implemented into the “Inter-Bank” Blockchain Corda)

Solidity is the code language that enables users to write smart contracts and run applications on Ethereum Blockchain.

## Golem (GLM)

Golem Network is a distributed computational power network based on Ethereum Blockchain, thanks to GLM token a user can access the computing that he needs at any given moment.

Researchers, Institutions and Organizations have no longer to install big servers in-house or rely on third “trusted” parties to run heavy computational models. These kinds of activities which often are based on sensitive data, can be performed through Golem cheaper, more scalable, and safer than in-house and centralized cloud computing solutions. Golem since its beginning registered a huge success, with its ICO in 2016 in which 8.6 million \$ were raised in less than half an hour, reaching today a capitalization equal to almost 600million \$. (13.04.2021)

## **CBDC**

This acronym stands for Central Bank Digital Currencies and today it is a mere theoretical type of Coin since no government has developed its own digital currency as legal tender. Many central banks are investigating this opportunity, considering which are the benefits that would provide to citizens and economy as whole. Since their just theoretical existence they are not necessarily linked to a specific DLT technology.

### **The Venezuelan case, the Petro.**

Up today Petro is the only CBDC token issued, even though it is a very controverse case and with a negative output. In 2017, given the tremendous economic situation in which Venezuela was suffering, hyper and inflation rate and heavy commercial restrictions dictated by US's government (Inflation data), the dictator Maduro decided to explore the Crypto Currencies World to face its country economic challenges.

On the 20 February 2018 Petro was officially presented by Maduro's government, the Coin's value was linked with Venezuelan's Oil reserves, creating a contradiction in terms with the concept of "crypto currencies", given their decentralised nature.

Jimenez, the coder who supported the creation of this token originally willed to give its country a genuine government independent token to face the crisis. Then when it was already structured in this way, the financial minister forced him to make such a link with national oil reserve, turning the project into sophisticated way to evade sanctions and still having in full control the National currency.

Shortly after US banned it, letting Venezuela gathered just 3 million dollars, it turned to be a failure having not addressed country's troubles of which Citizens are still suffering nowadays.

### 1.1.3.2. Barclays Framework

Barclays is one of the longest-lived firms within the financial industry with its over 325 years old history and a durable strong presence in UK and US' market. In 2014 they firstly approached the Blockchain World aiming to integrate within the Financial Sector's processes different benefits: Simplification, Rationalization and risk-reduction.

Barclays accepted the challenge set by the European Commission to evaluate the current EU Framework and from this to provide a new one that better fosters innovation and at the same time grants risk mitigation for crypto asset's investors and users. Given that other classifications have failed in keeping up this innovative fast paced Blockchain industry.

On the 26 August 2020 they first published the following classification:

The Objectives of this classification:

- To Bring Regulatory Certainty for Market Participants.
- To Safeguard the EU's principle: "same activity, same risk, same regulation"
- To Drive Regulators and Policymakers across different Nations and Organizations to consolidate a unique framework, given the cross-border nature of several crypto asset.
- To Obtain a more detailed classification of the existing EU's framework: "Exchange, security and Utility", that given the dynamic innovation of this asset typology it must evolve at the same pace of the technology evolution.

#### Crypto-Asset Definition

A crypto asset is a digital representation:

- of value or rights,
- which may be transferred and stored
- using cryptography and DLT or similar technology

#### Uses and Key Attributes of Crypto-Assets

**A. Payment:** Is the crypto asset being held and transferred primarily for the purposes of buying or selling other assets?<sup>3</sup>

**B. Security/ Investment/Financial instrument:** Does the crypto asset provide interests to underlying assets or a pool of assets? Does the crypto asset have expected fluctuation in pricing? Does the crypto asset provide entitlement to proceeds or a right to vote?

**C. Access to Platform/Services (Utility):** Crypto-asset's use as a means of accessing a DLT platform and/or a medium of exchange for the provision of goods and services provided on the DLT platform, and does not have value or application, outside of the DLT platform on which it was issued?<sup>4</sup>

**D. Other:** As the crypto-asset market evolves and the understanding of uses matures, additional uses beyond those identified in A, B, and C above may need to be addressed or identified.

## Barclays Crypto Asset Classification

<p><b>Cryptocurrencies</b></p> <ul style="list-style-type: none"> <li>No central issuer.</li> <li>Does not represent a financial interest in a company, partnership, or fund, including an ownership or debt interest, revenue share, entitlement to any interest or dividend payment otherwise.</li> </ul>	<p><b>Price-Stable Crypto-Assets</b></p> <ol style="list-style-type: none"> <li><b>Central Bank Digital Currencies</b> <ul style="list-style-type: none"> <li>Liability of a central bank representing fiat sovereign currency.</li> <li>Withdrawable for cash at par</li> </ul> </li> <li><b>Depository Coins</b> <ul style="list-style-type: none"> <li>Represents a claim on bank or other highly regulated depository institution.</li> <li>Representation of customer deposits in a single fiat currency held at a bank or other highly regulated depository financial institution which may or may not pay interest                             <ul style="list-style-type: none"> <li>“Redemption at par” (e.g., it is a withdrawable for a fiat credit to account at a stated fixed fiat value)</li> </ul> </li> </ul> </li> <li><b>FMI Tokens</b> <ul style="list-style-type: none"> <li>Participants hold settlement balances in a payment scheme which are “tokenised” Settlement balances reflect deposits in a single fiat currency held at a central bank.</li> <li>“Redemption par” (e.g., it is a withdrawable for fiat credit to account at a stated fixed fiat value)</li> </ul> </li> <li><b>Stablecoins:</b> designed to minimize/eliminate volatility inherent in cryptocurrencies.                     <ol style="list-style-type: none"> <li><b>Variable Redemption Asset Backed Coin</b> <ul style="list-style-type: none"> <li>One for one backed with underlying assets.</li> <li>Variable redemption value from the issuer based on price of real (including financial) assets.</li> </ul> </li> <li><b>Fixed Redemption Asset Backed Coin</b> <ul style="list-style-type: none"> <li>One for one backed with underlying assets.</li> <li>Dlm</li> </ul> </li> <li><b>Algorithmic Coin</b> <ul style="list-style-type: none"> <li>Typically, not backed by any underlying assets.</li> <li>Each token can be pegged to a price level or a unit.</li> <li>Token price peg is maintained through buying, selling or exchange among assets or some other pre-determined mechanism.</li> </ul> </li> </ol> </li> </ol>
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<p><b>Native Security/ Financial Instrument Token</b></p> <ul style="list-style-type: none"> <li>Originated/issued solely on DLYT with its own unique characteristics.</li> <li>Satisfies the applicable regulatory definition of a security or analogous term/ categories, such as certain types of ‘financial instruments’, under local law.</li> </ul>	<p><b>Token Representing Securities ownership</b></p> <p>Representation on DLT of underlying securities issued on a different platform (i.e. a traditional CSD, registrar, etc.) There is a process to link those tokens with the underlying securities.</p>	<p><b>Representation on DLT of Ownership or Rights in Other Assets</b></p> <ul style="list-style-type: none"> <li>Representation on DLT of underlying assets (not securities) controlled/owned by the issuer, or of certain rights in underlying assets (e.g., warrants that are not considered financial instruments)</li> <li>Includes ownership in real estate, art, intellectual property rights, etc.</li> <li>Includes also non fungible assets that only exist in digital form on a DLT network such as digital art, digital collectibles, or domain names on smart contract platforms.</li> </ul>	<p><b>Utility token</b></p> <ul style="list-style-type: none"> <li>A means of accessing a DLT platform and/or a medium of exchange for which participants on a DLT platform may use for the provision of goods and services provided on a DLT platform or</li> <li>Tokens that are not native to the underlying network but are used for accessing application that are built on top of a DLT platform (dApp).</li> </ul>
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### 1.1.3.3. A comprehensive Crypto Asset Taxonomy

This Taxonomy, published on the 10 June of 2020 from Lucerne University of Applied Sciences and Arts, it is particularly relevant in the light of this Report. It has indeed, the objective to combine two Worlds, Blockchain one and traditional financial one, by providing 14 attributes by which it is possible to classify at the same time both crypto assets and more traditional financial assets.

These attributes have been extracted and “conciliated” from influential and established classification from the two spheres, the ones listed in the table below:

Financial World	Crypto Asset World
CFI (Classification of Financial Instruments) by ISO (International Organization for Standardization) in 1997 [last version ISO 10962:2019 in 2019]	FINMA (Swiss Financial Market Supervisory Authority) in 2018 O. et al. (Oliveira et al.) B. et al. (Ballandies et al.) MME Swiss Consulting Firm in May 2018
ACTUS (Algorithmic Contract Types of Unified Standards) by Ramberts and Mendelowitz	ITC (International Token Classification) by ITSA September 2019 TTI (Token Taxonomy Initiative) by the EEA in November 2019

#### CFI by ISO (Financial World)

CFI (Classification of Financial Instruments) by ISO (International Organization for Standardization), the worldwide known Organization which is committed to provide standards for different industries.

The latest version of this standard is ISO 10962:2019, which was published in 2019 and provides a 6 digits code to identify a specific financial instrument type. The first digit identifies the main category of the instrument (Equity, Loans, Derivatives, etc.); the second one instead the subcategory (in the case of Equities: Common Shares, Preferred Stocks, etc.) and finally the last four represents the attributes for each subcategory (always given the equities example: Voting Rights, Status Payments, etc.).

#### ACTUS (Algorithmic Contract Types of Unified Standards) by Ramberts and Mendelowitz (Financial World)

The purpose which led to shape this classification was the creation of a global standard to fill up the deficiencies which emerged by the financial crisis of 2008 in terms of Risk Management and Financial Regulation.

This standardization process to compare among each other financial instruments started by grasping similarities in their underlined cash flows, as it is stated in the institution main goal:

*“The goal of ACTUS is to break down the diversity in financial instruments into a manageable number of cash flow patterns – so called Contract Types (CT).”*

The outcome of such process, led to the following classification:

- Financial contracts
  - Basic contracts
    - Fixed income
    - Index-based products
  - Combined/derivatives contracts
    - SYMMETRIC FINANCIAL PRODUCTS
    - Options
    - Securitization Products
  
- Credit Enhancement
  - Guarantee contracts
  - Collaterals contracts
  - Margining contacts
  - Repurchase Agreements

**FINMA** (Swiss Financial Market Supervisory Authority)

FINMA the equivalent of the Italian Consob, promptly established a classification on Crypto assets on the 16 February of 2018 in response to the huge demand in implementing Blockchain technology in the financial industry with the issue of many ICOs of the previous year.

This guideline defines mainly three distinguished clusters (which are similar to EBA’s categories), recognizing that such a classification is not exhaustive and hybrid tokens may exist:

- Payment Tokens
- Utility Tokens
- Asset Tokens

The specific Token is furtherly defined by the FINMA as a financial instrument or not, depending on its economic function and the rights to it associated. This Supervisory authority offers the possibility to classify and understand the token characteristics before its issue, guaranteeing in this way a certain level of compliance solidity.

**Oliveira et al. & Ballandies et al.**

These two classifications both go beyond the legal aspect and they both have an academic background; resulting similar to each other on the ground that a similar methodology was conducted to obtain them.

It was indeed conducted in both cases a design science research approach on different blockchain project in being, and the following attribute classification was extrapolated respectively for the two cases:

- **O. et al.** (Attributes class, Function, Role, Representation, Supply, Incentive system, Transactions, Ownership, Burnability, Expirability, Fungibility, Layer, and Chain) (13 Attributes)
- **B. et al.** (Distributed ledger type, Origin, Address traceability, Turing completeness and storage in the distributed ledger dimension, Underlying, Unconditional creation, Conditional creation, Transferability, Burn, Supply in the token dimension, Action fee, Read permission, Actor permission in the action dimension, Fee, validate permission, write permission, proof, type in the consensus dimension.) (16 Attributes)

### **BCP (Blockchain Crypto Property) Framework for Assessment of Crypto Tokens by MME Consulting Firm**

MME Consulting Firm is a Swiss based company (Zurich and Zug) which is committed to provide legal and tax consultations in complex commercial scenarios. The objective of this classification is to provide a reliable classification model and risk assessment criteria to identify crypto assets, going beyond Country's specific regulations, offering in this way a multijurisdictional comprehension of existing Blockchain Tokens.

The assessment method to obtain this classification is indeed based on the following elements:

- Basic function/ Main use of the token
- Existence of a Counterparty
- Crypto Asset Type
- Underlying Asset or Value

In this manner are identified these three main clusters, which in turn are sub categorized (as shown in the chart below):

- Native Utility Tokens
- Counterparty Tokens
- Ownership Tokens

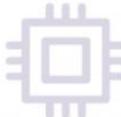
BCP Class	1 - Native Utility Tokens <i>No legal counterparty (decentralized ecosystem)</i>				2 - Counterparty Tokens <i>Natural/legal person as counterparty (relative right)</i>					3 - Ownership Tokens <i>Right in rem (absolute right)</i>		
BCP Sub-Class	Basic Tokens	Infrastructure Access Tokens	Application Access Tokens	Application Settlement Tokens	IOU Tokens	Derivative Tokens	Fund Tokens	Equity Tokens	Membership Tokens	Joint-Ownership Tokens	Co-Ownership Tokens	Sole-Ownership Tokens
FINMA Equivalent	Payment Tokens	Payment and/or Utility Tokens			Payment, Utility and/or Asset Token	Asset Tokens			n/a	n/a		
Functions	Medium of exchange, unit of account and store of value providing access to an underlying technology (1)	(1) Access to enhanced functionality infrastructure, i.e. SCS or burning mechanisms, without legal claim against a counterparty	(1) Access to decentralized application or platform without legal claim against a counterparty (2)	(1) P2P settlement function on an application / platform	(1) Tokenization of a claim against a legal counterparty i.e. right to receive funds, services or use (infrastructural)	(1) Tokenization of a claim	(1) Tokenization of a fund share	(1) Tokenization of a personal membership	(1) Tokenization of a personal membership	(1) Joint-ownership of an asset, i.e. IP	(1) Co-ownership of an asset, i.e. IP	(1) Sole-ownership of an asset, i.e. IP
Underlying Value	None	None	None	None	Debt / Claim	Derivative (i.e. D)	Fund share	Equity share	Personal membership right	Ownership of an asset	Ownership of an asset	Ownership of an asset
Examples	Bitcoin, Bitcoin Cash, Litecoin, Monero, ZCash	Ether, Ether Classic, Cardano, Lisk, ICON, EOS	Wings	Siacoin, Mysterium, Filecoin	Lykke Colored Coins, "Utility Tokens" with counterparty	Modum	Blockchain Capital	Daura C-Shares	tba	tba	tba	tba

(Source: Framework for Legal and Risk Assessment of Crypto Tokens published on the 1<sup>st</sup> of May in 2018 by MME)

### ITC (International Token Classification) by ITSA

ITSA (International Token Standardization Association), it is Non-Profit Organization which aims to develop Market Standards for Crypto Tokens under different vertical dimensions:

- Economic
- Technological
- Legal
- Regulatory Vertical

E Economic Dimensions		T Technological Dimensions		L Legal Dimensions	
<b>EEP</b> Economic Purpose	<b>EIN</b> Industry	<b>TTS</b> Technological Setup	<b>LLC</b> Legal Claim		
What is the economic purpose of the token as intended by the issuer?	What kind of industry is the token intended to be used in?	Which layer of the distributed ledger is the token implemented on?	What right does the token provide its owner with?		
<ul style="list-style-type: none"> <li>Token as a means of payment</li> <li>Token as a means of utility provision</li> <li>Token as a means of investment</li> </ul>	<ul style="list-style-type: none"> <li>20 industry categories &amp; various sub-categories</li> <li>3 major industry categories:               <ul style="list-style-type: none"> <li>Information</li> <li>Finance and Insurance</li> <li>Arts, Entertainment and Recreation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Token is implemented on the DL itself</li> <li>Token is implemented by a protocol run on the DL</li> </ul>	<ul style="list-style-type: none"> <li>Token with no claim / legal right</li> <li>Token with relative right(s)</li> <li>Token with absolute right(s)</li> </ul>		
					

<b>Name:</b>	Bitcoin	<b>Symbol:</b>	BTC / XBT	<b>TOKENBASE Rank:</b>	1
<b>ITIN:</b>	TP3B-248N-Q	<b>Website:</b>	www.bitcoin.org	<b>CMC ID:</b>	1
		<b>Github:</b>	https://github.com/bitcoin	<b>CMC slug:</b>	bitcoin

Dimension		Classification	Rationale
EEP	Economic Purpose	Unpegged Payment Token EEP21U	Free-floating digital currency
EIN	Industry	Payment Services EIN10A	Token is intended as an universal means of payment
TTS	Technological Setup	Ledger-Native Token TTS41	Tokens are directly implemented on the blockchain
LLC	Legal Claim	No-Claim Token LLC31	Token does neither provide any claim against any counterparty nor an absolute right
	<i>Future work</i>	<i>Future work</i>	<i>Future work</i>

(Source: ITC Classification by ITSA published on the 25th of June in 2018)

#### TTI (Token Taxonomy Initiative) by the EEA

The EEA (Enterprise Ethereum Alliance):

- Token Type: Fungible vs. Non-Fungible.
- Token unit.
- Value Type (intrinsic value, reference value)
- Representation Type (Common or Unique)
- Template type (Single or Hybrid parent/child relationships between tokens")

## Comprehensive Crypto Asset Taxonomy

In the following scheme we can see the results of the conciliation process of the abovementioned heterogeneous classifications, that is a comprehensive list of 14 attributes to classify digital assets. Precisely we can even see in which classification each of the attributes occur.

Attribute	ISO [1]	B.&M. [2]	FINMA [4]	O. et al. [8]	B. et al. [9]	MME [10]	ITSA [11]	EEA [12]
Claim structure	x	x	x	x		x	x	
Technology			x	x	x	x	x	x
Underlying	x	x	x	x	x	x	x	x
Consensus/Validation mechanism					x	x	x	
Legal status			x	x		x	x	
Governance				x	x	x		
Information complexity	x	x			x			
Legal structure	x	x	x			x		
Information interface					x			x
Total supply		x		x	x			x
Issuance		x		x	x			x
Redemption		x		x	x			x
Transferability			x	x	x	x		x
Fungibility				x				x

Such attributes could be declined as it is represented below, constituting in such manner a flexible tool which could be innovation leading and not lagging:

<b>Claim structure</b>	No claim(s)		Flexible claim(s)			Fixed claim(s)	
<b>Distributed ledger technology</b>	Native token (Coin)				Protocol token (Token)		
<b>Underlying</b>	No Underlying	Company	Bankable asset	Cryptographic asset	Tangible asset	Contract	
<b>Ownership</b>	Public				Private		
<b>Consensus Mechanism</b>	Instant Finality		Probabilistic finality				
			POW	POS	Hybrid	Other	
<b>Legal status</b>	Regulated				Unregulated		
<b>Governance</b>	Centralised				Decentralised		
<b>Information Complexity</b>	Value		Contract		Turing completeness		
<b>Legal Structure</b>	No legal structure	Foundation	Note/bond	Share	Other		
<b>Information interface</b>	No interface		Qualitative		Quantitative		
<b>Total Supply</b>	Fixed		Conditional		Flexible		
<b>Issuance</b>	Once		Conditional		Flexible		
<b>Redemption</b>	No Redemption		Fixed		Conditional	Flexible	
<b>Transferability</b>	Transferable				Non-Transferable		
<b>Fungibility</b>	Fungible				Non-Fungible		

Flexibility of this instrument relies in the fact that digital assets are not insert in specific classification blocks, as it happens for the previous analyzed frameworks (EU and Barclays), instead it allows to define digital assets according to 14 variables that are declined to give an exhaustive and pragmatic comprehension of the analyzed instrument.

Previously analyzed Frameworks suffer from the same problem with slightly different nuances. The first, European community one is a Framework which clusters too much broad categories, while the second although defines more targeted clusters it also loses the implicit overlapping of a crypto asset with more categories.

A token can belong at the same time to different categories, depending on its usage. An example for all is Ethereum that was born as a Blockchain to support decentralized application, but which token ETH is also used both as Investment and both as Payment token.

This Comprehensive classification allows immediately to understand the main characteristics of traditional and crypto assets, having the opportunity to compare them among each other easily with a holistic approach which aims to fill the gaps among these two different but converging Worlds.

It is as a matter of fact a Morphological Box, through which is possible to frame Assets: from traditional cash to Blockchain's ones as tokens on the Ethereum platform.

Being it a useful instrument for users and regulators to understand and regulate the multitude of already existing and to be tokens; providing different stakeholders a tool to share a consistent view, by establishing a standardized terminology. (Given that an asset could potentially have at the same time physical, digital, and crypto nature)

## 1.2. NPL's Market Analysis

### 1.2.1. Introduction to NPLs.

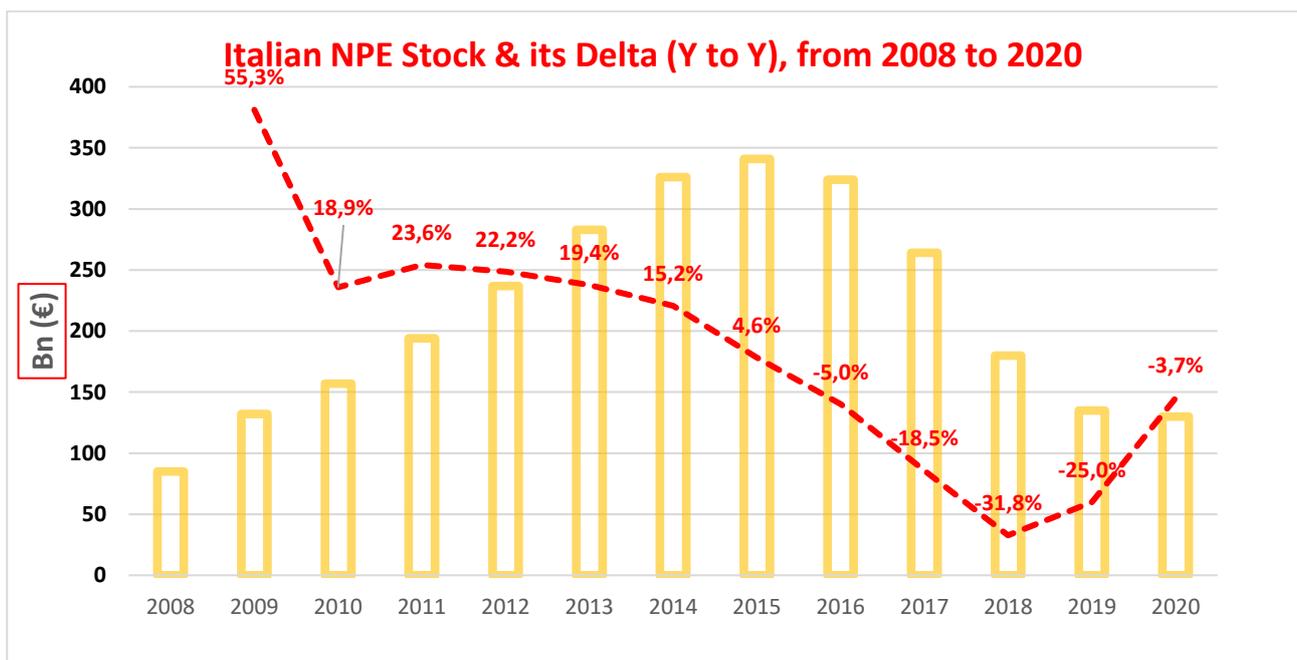
As a result of the financial crisis of 2008, the sub-prime mortgage crisis, in Europe and in particularly in Italy we had been witnessed to a deterioration of the Financial System which led to an explosion of NPE in Italian credit institutions' balances from 2007 to 2015. Passing by 85 bn € of 2008 to 341 bn € of 2015, recording an increase higher than 400% and triggering clear damages in the economic and social fabric.

The presence of these insolvent credits was direct cause of the credit crunch, phenomenon that brought to a contraction of the economic activity in our Country. The lending capacity decreased for Credit Institutions, having to shelve a large amount of capital to face increasingly demanding reserves to sustain NPL in their balances.

This credit crunch caused an extended recession, of which even today we feel the effects, even though the right measures to reprimatinate the pre-crisis stocks of these credits were put in place; so, aiming to redirect the Financial System back to its adequate lending balance.

The route taken from EU's banking supervision bodies and so furtherly from Italian ones, combined with the creation of an NPL's Market thanks to the entrance of specialized players, it has been giving the desired results. Both reducing the high amounts of these Stocks and both strengthening lending and patrimonial frameworks to avoid new systemic crisis to happen in the future.

As we can indeed underline for Italy, the amount of NPL from its maximum pick of 2015 was drastically reduced by almost 62%, reaching 130 billion € in Q1 2020 (last quarter before the pandemic situation spread in the Western World).



(Source: *The Italian NPL Market the Calm before the Storm* – by PWC published in December 2020)

New challenges and opportunities are on the horizon, due to the pandemic crisis, which realistically would bring these Stocks to raise up again within the Italian Banks' Balances.

*"The economic downturn will lead to an increase in NPL in the short to medium term. When how much and how will this increase materialize? Probably not in the next few months, during which the shield of payment holidays and public support through the release of state guarantees will largely "freeze" the portfolios, delaying and possibly reducing the flows to NPE.*

*Nevertheless, moratoria will end, and the combined effect of the decrease in revenues and a worsening financial position of many companies will lead to a severe scrutiny of the capability to pay creditors which will turn into an unavoidable reclassification to default of a significant number of counterparties. **The Italian NPL Market, The Calm before the Storm, PWC December 2020"***

In this perspective, the Blockchain technology is having and will have a fundamental impact in improving "NPL's Value Chain Processes"; furthermore, it could even enable new players to access the market, creating secondary markets for an asset class that so far has remained reserved for large investment funds highly specialized and structured for their management.

The importance of a secondary Market for this peculiar asset class and for the whole economy in ultimate analysis, it is remarked by the fact that the European Commission is addressing efforts to tackle obstacles that today exist for the creation of a proper and effective Market of such kind.

On the 16 of June 2021 the European Commission started the consultation: **"TARGETED CONSULTATION ON IMPROVING TRANSPARENCY AND EFFICIENCY IN SECONDARY MARKETS FOR NON-PERFORMING LOANS"** to which participants may answer by the 8 of September 2021.

*"One of the key actions in fostering secondary markets for NPLs is to improve the quantity, quality and comparability of NPL data. Secondary markets can be broader and more efficient if market participants have more and better data."*

Throughout a questionnaire Stakeholders involved in the NPL industry (NPL sellers, NPL purchasers, Asset management companies, Specialized Servicers) are asked to provide their own views and suggestions for the European Commission to reach sufficient information to design new regulations with the purpose to improve the effectiveness of NPL secondary Market, which virtually still does not exist apart from infrequent transactions.

In the light of the scope of this report, it is firstly necessary to clearly define which are the parameters set by EBA to define which are the conditions to define a credit as NPL.

## **NPL Definition**

EBA on the 21 October of 2013 published its first definition of NPE, Non-Performing Exposures, to give different national banking authorities a unique framework to classify such bank "sufferings". (*EBA FINAL draft Implementing Technical Standards on Supervisory reporting on forbearance and non-performing exposures under article 99(4) of Regulation (EU) No 575/2013*)

Given that each national authority had a certain degree of freedom classifying credits, treating impaired exposures, defining evaluating and reporting forborne exposures and so on and so forth.

### **NPE (EBA definition)**

NPE (Non-Performing Exposures) are exposures (loans, debt securities, off-balance-sheet items) other than held for trading that satisfy either or both of the following criteria:

(a) material exposures which are more than 90 days past due.

(b) the debtor is assessed as unlikely to pay its credit obligations in full without realisation of collateral, regardless of the existence of any past-due amount or the number of days past due.

Having these two following criteria, non-performing exposures include the defaulted and impaired exposures, distinguishing them from performing ones.

By definition NPLs are subclass of NPEs, consisting of no longer performing Loans; but in the operating language NPL e NPE became indeed synonyms, since with NPL we tend to identify all the amount of outstanding suffering claims owned by a financial institution.

### **UTP (Unlikely to Pay definition)**

UTP, as the name implies, is that credit exposures that has not become an NPL yet, but for which the Bank can anticipate its future insolvency, except by enforcing its guarantees.

This kind of exposure could for instance arise in thriving companies, that had to face a temporary financial distress and can therefore, if identified in time, be brought back to good health with targeted measures.

To prevent that these exposures turn into NPL it is of fundamental priority to act promptly, so to identify the so called UTP's triggering events; to avoid incurring in the necessary capital increase to deal with transformation in "Bad Debt". Blockchain technology has huge potential to reduce times in identifying these red flags, enabling Banks to have more time to block at the birth new NPLs.

Being not only a solution to the problem already shown, but also having a crucial role in preventing the financial deterioration.

### **Forborne Exposures**

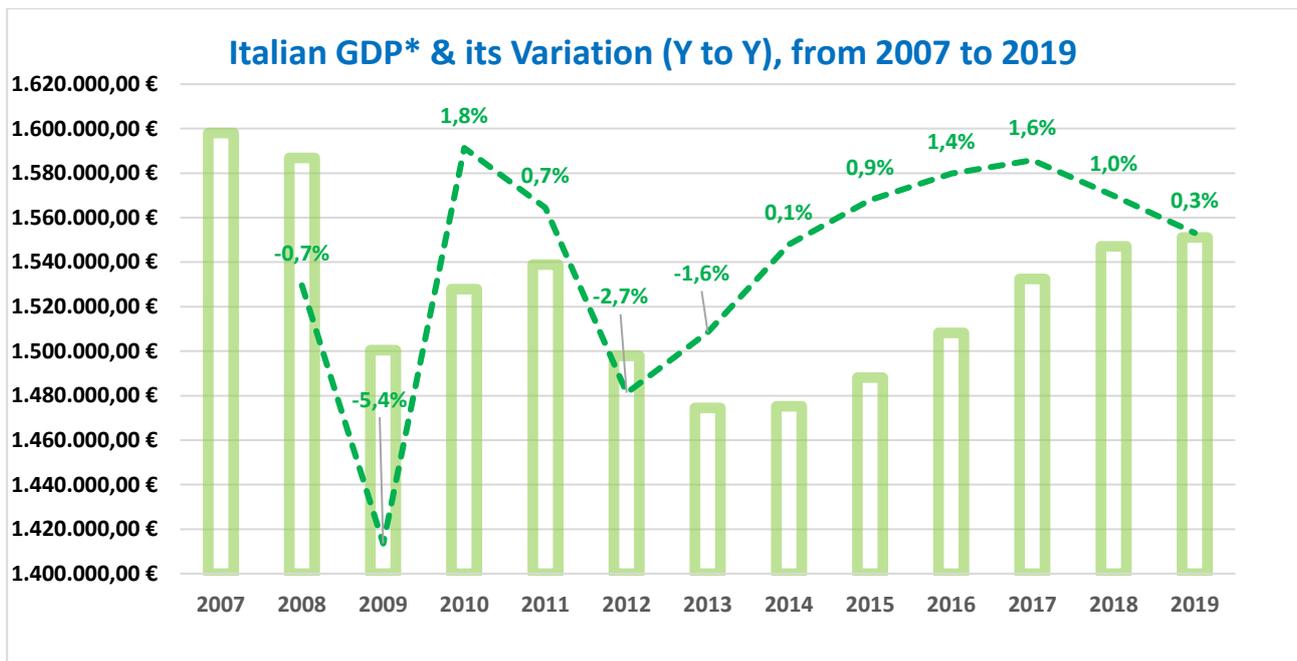
EBA under this article furtherly defined Forborne Exposures, those kinds of exposures renegotiated among the lender and the debtor in response to its temporary financial stress. Distinguishing them into forborne performing vs. nonperforming.

Initially an exposure is defined as non-performing given that the debtor is under a financial distressed situation and a concession agreement is given. Then if after 12 months from the moment in which the exposure was defined as "non-performing", if all the payments have been undertaken and if from the debtor no anomaly emerges the exposure can be classified as "forborne performing".

## 1.2.2. Macro-Economic Scenarios and Trends in the Italian NPL's Market.

Which are the factors that contributed to a constant growth of NPLs in Italian Banks till 2015? Which are the reasons for which Italy was the worst in absorbing these credits? And which are the outlooks for these factors in the future?

Subprime financial crisis and subsequently sovereign debt one in 2012 brought to a drastic economic contraction, as represented from the graph below. (Graph which represents Italian GDP chain-linked to 2015 values, namely net from price's variation of the underlined goods: in other words, discounting inflation)



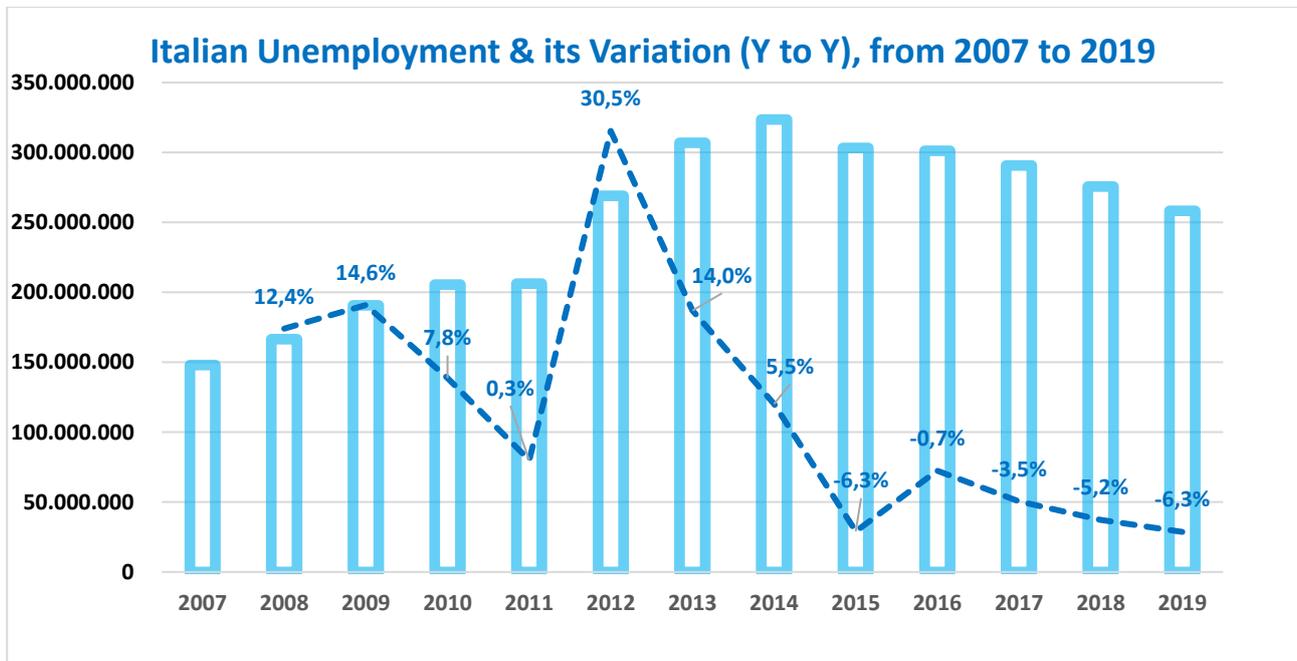
### GDP

The relationship between GDP's performance and NPL's stock level appears visible and inversely proportional, it is therefore foreseeable that a little supported GDP's recovery would in turn contribute to an increase of this accumulation.

In 2020 Italian GDP has slightly overperformed the extremely negative expectations forecasted at the beginning of the pandemic situation (-11% compared to 2019), recording -8.7% at the end of the year. Outlooks for 2021 and 2022 are those of a timid resumption, respectively 6.5% and 2.8% which should bring back GDP to a pre-pandemic level; fundamental will be this recovery to estimate new inflows of NPLs in the credit system. Besides, we will also see a reshaping in NPL's type composition, given that some sectors have been more impacted than others (especially Tourism, Restaurant and Transportation sectors).

## Unemployment Rate

Performance of the unemployment rate will play in turn a crucial role in this direction, till now emergency policies have prevented the collapse of employment (unemployment rate was 9.9% at the end of 2020). Unemployment rate is however forecasted to growth in the following biennium, respectively 10.7% for 2021 and 11.1% for 2022).



Thanks to the supporting policies adopted by our government at Covid's outbreak, respectively with decrees of 17/03/2020 "Cura Italia", 08/04/2020 "Liquidità" e 19/05/2020 "Rancio", Italian Enterprises and families received financial aid, because of moratorium on mortgages, loans granted by the State and in other forms.

Financial support undoubtedly could not be eternal, in fact a fundamental role to economic development recovery in our Country will be assumed by the Recovery Plan.

All these Macroeconomic factors will have an impact of NPL's Stock, as a matter-of-fact new substantial inflow are forecasted (60bn€ in 2021 and 100 bn€ of inflows, **The Italian NPL Market, The Calm before the Storm, PWC December 2020**)

It is interesting underline how indeed several analysisists forecast that new NPL's wave will be shorter in respect to the one verified from 2008 to 2015 in the light of solid banking system more prepared to absorb and manage these credits and a "niche" market that has been consolidated in these years. This positive outlook will necessarily have to face up a bureaucratic machine that still proves to be congested and inefficient, despite some little improvement, as we will analyze in the following paragraph.

## Italian Competitiveness

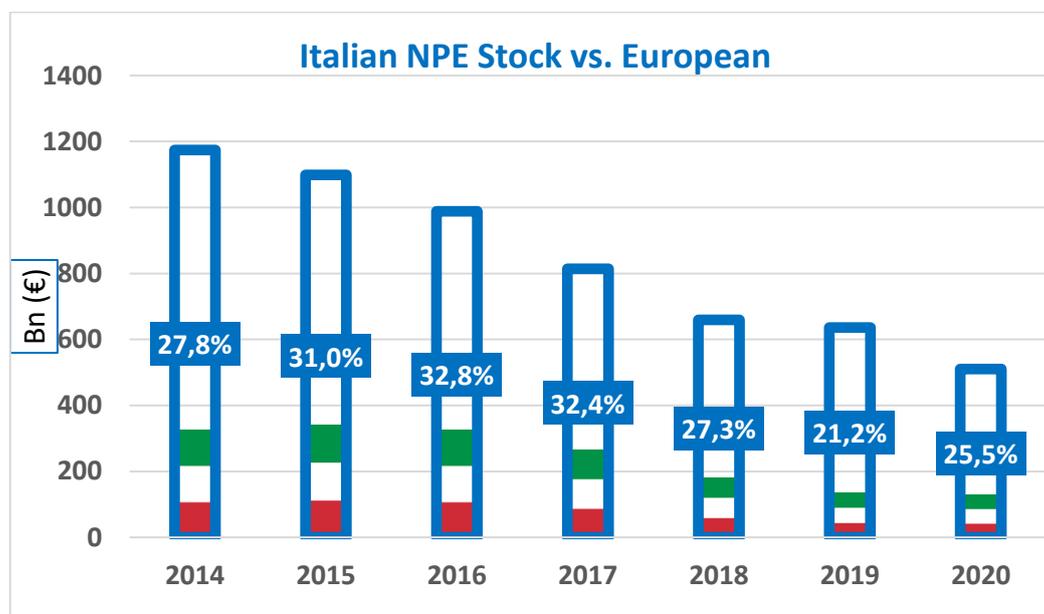
The Competitiveness in our Country, compared to our European partners and competitors is exceptionally low. With the term Competitiveness, in this analysis, we refer to that set of laws and frameworks that regulate the entrepreneurial activities in one Country: which indeed contribute to slow down or boost the economic development of it.

To compare the competitiveness of Italy, this report bases its analysis on the data of “Doing Business 2020” report; annually conducted by the “World Bank Group” on 190 Nations, comparing different objective factors to define a ranking of the best states in which doing business analyzing the legal framework out of them.

In this Ranking we turn out to be 58<sup>th</sup>, taillight with respect to other European Countries; dramatic is the situation concerning the average time to enforce contracts by courts, extended duration which heavily impacts on the efficiency of NPL’s Market.

	Denmark	Germany	Spain	France	Netherlands	Italy
<b>Ranking</b>	4	22	30	32	42	<b>58</b>
<b>Score</b>	85,3%	79,7%	77,9%	76,8%	76,1%	<b>72,9%</b>
<b>Enforcing Contracts (days)</b>	485	499	510	447	514	<b>1120</b>
<b>Cost (% of claim value)</b>	23,3%	14,4%	17,2%	17,4%	23,9%	<b>27,6%</b>

This slowness in credits’ recovery has been one of the most influent factors impacting the poor performances in the reduction of the amount of NPLs in our National Banking System, compared to our European partners. This factor, which underlines the well-known inefficiencies of our bureaucratic machine, must be a cause of concern for the future of our Country.



(Source: *The Italian NPL Market the Calm before the Storm* – by PWC published in December 2020)

The acceleration of our juridical processes is of maximum priority for the sake of economic development in Italy, as underlined by European authorities in the “Country Specific Recommendations” in 2019 and 2020.

It is matter of the “Recovery Plan”, the modernization and the improving in efficiency of our juridical system; above all, it is a necessary term to be fulfilled to have the right to access this fund to restart an economy stagnated from the pandemic.

One of the pillars of the Recovery Plan is to reform the juridical system with its ambitious to decrease the length for civil and penal trials respectively of 40 and 25%.

In fact, the recent draft of the Recovery Plan (26.04.2021) it is stated: *“the fundamental objective of projects and reforms in the justice sector it is the reduction of time needed to obtain a definitive judgement, that today continues to record inadequate performances”*. Furtherly in the same date our prime minister Draghi declared, regarding this plan: *“It faces the structural nodes of our civil and penal trial. Despite progresses of these last years, excessive delays still remain”*.

It is in this scenario that the political willingness of legislative improvement must grasp the chance to benefit from DLT and Blockchain Technology, to return to be competitive in the European Landscape.

### **The Estonian Case**

Significant in this sense it is Estonia’s example, Country that since 2012 has integrated Blockchain in its public administration thus managing to offer more efficient services to citizens.

This strategic choice happened mainly for two factors, that are tied together: first the fact that Estonia is a relatively young country with a lean bureaucratic machine and second the interfering in the form of cyberattacks probably by the nearby Russia (there is no strict evidence that the Russian Government was involved). Interferences that started to took place, after an episode which generated friction among Estonians and Russians, namely the displacement of “the Bronze Statue” from the city center of Tallin to a military cemetery outside the city. Statue which represents two totally different meanings for the two populations; for Russians it is a symbol of the victory over Nazi in the WWII, instead for Estonians it was the symbol of soviet oppression. On the 27 of April 2007 the day after heavy tensions triggered by this displacement, a massive cyber-attack to Estonia was launched compromising several services in the entire Country: ATM Machines, Online Banking Services; Governmental Services; Emails; Media and many more.

This event enhanced the awareness regarding cyberspace for Estonia which started to see in Blockchain a systemic solution to protect itself against abroad attacks.

*“2007 was a wake-up call, helping Estonians become experts in cyber defense today. It was a great security test.”*

reported Tanel Sepp, cyber security official at Estonia's Ministry of Defense, in the article published by BBC on 27 April 2017: *“How a cyber-attack transformed Estonia”*

In fact, Blockchain is a systemic choice which enables to eliminate cyberattacks which exploit weaknesses inherent and between information flows among heterogeneous centralized systems.

Respectively integrating the following ledgers on Blockchain:

- Healthcare Registry

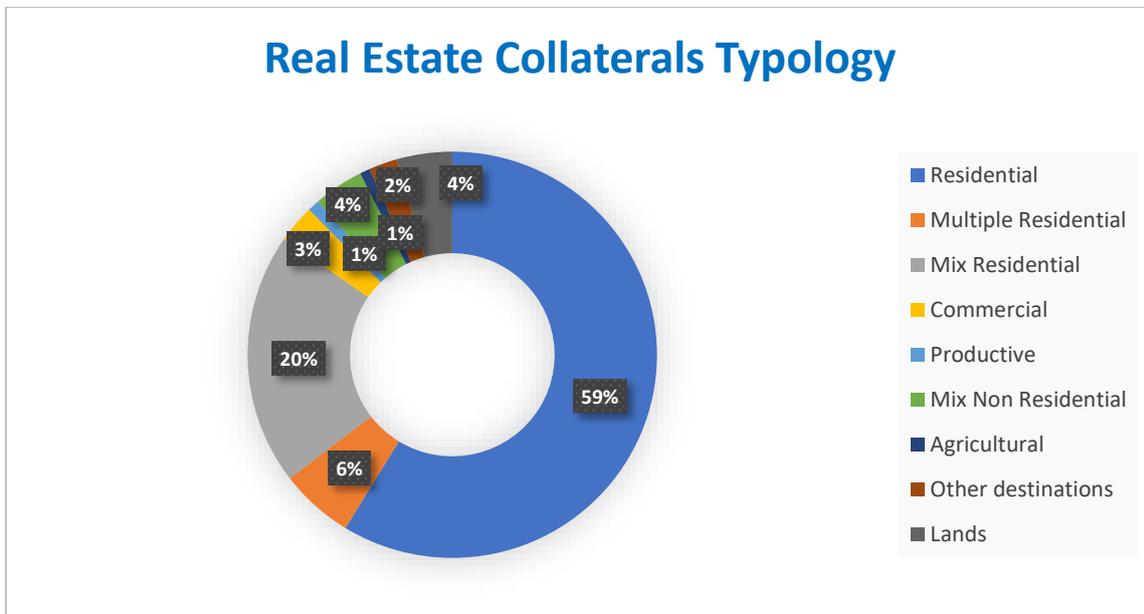
- Property Registry
- Business Registry
- Succession Registry
- Digital Court System
- State Gazette

This was possible thanks to the development of its own Blockchain: KSI (Keyless Signature Infrastructure), which was then even implemented by other notorious Organizations such as: (NATO and the U.S. Department of Defense.)

It is estimated that with the advent of this technology in the Public Administration Estonia achieved savings both in terms of time and cost; respectively 1400 years of working time and 2% of GDP per year.

## Real Estate Market

NPL and Real Estate Market are strictly bounded together since the vast majority of assets used as collaterals for secured debts are real estate. As shown from the Report on Mortgages of 2019 drafted by the Italian tax agency, given 100 billion € of mortgages allocate, 950.926 real estates were set as collaterals.

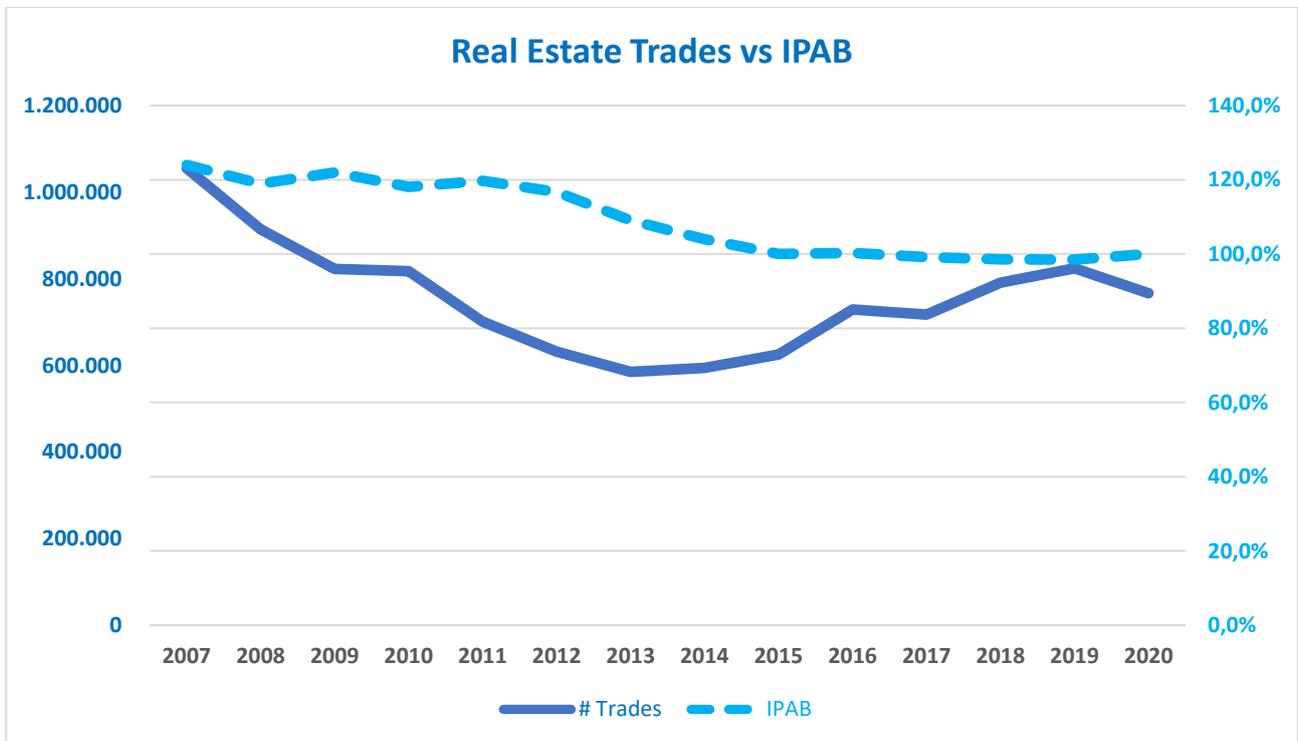


(Source: Mortgage Loans Report 2019, published by the Real Estate Observatory (OMI) Italian Tax Agency on the 11 of October 2019)

In fact, if the Real Estate Market is economically healthy (it has therefore growing trends for prices and or for the number of transactions), NPL Market itself becomes attractive for specialized investors, which are looking for discounted opportunities from the disposal of these credits or from the sale of their real estate collaterals, once completed the juridical course to repossess these guarantees.

Vice versa, if the Real Estate Market is saturated, the NPL Market loses its attractiveness extending times to collect claims and reducing the recovery rate from the credit nominal amount.

The years prior to the financial crisis were characterized by a strong and constant growth of the Real Estate Market in US and consequently in Europe and Italy, featured by a strong speculative component, enlarging a Market bubble burst with the beginning of the crisis, which lead to a downturn of trades and prices. (In 2008, US House Index fell in value by almost 20%, as represented by the US House Price Index)



(Source: IPAB (Price Indexes of New and Existing Houses) by ISTAT in 2020)

As we can see from the graph above, after the financial crisis the number of real estate trades in Italy decreased till slightly recover again from 2014, despite price index level still have not recovered the levels of 2007.

From 2014 on the Italian Real Estate Market recovered, also thanks to the drive of important City and Asset Typology in the Market, one above all the city of Milan, which was little impacted by the real estate crisis

Despite the pandemic crisis in 2020 trades did not drop dramatically and prices remained stable, even though the market needs reshaped out of it (-7% Trades from 2019 to 2020); people expressed the need for real estate solutions with larger sizes and not necessarily located in the city center. Nevertheless, clouds are on the horizon according to the view of several industry experts.

*“The 2020 ended better than expected, but we still need to understand if “the chickens are coming home to roost” in the next months. For this reason, we remain cautious about the chance of future repercussions. Luca Dondi, Nomisma CEO, 8th April 2021”.*

The reasonable slowdown of this Market is an important risk factor to be considered for the NPL’s Market in the next years in our Country, given their tied relationship. It would be crucial to distinguish and set different strategies according to the collateral Real Estate typology, in the light of the pandemic situation in which we are still living in, which unavoidably will redefine ways of living, working and so inhabit real estates.

### 1.2.3. Actions undertaken to reduce NPL stock in Europe and in Italy.

*Which were the measures adopted by the European authorities that contributed to reduce NPLs in Europe and in Italy? Which are the characteristics of the NPL's Market established starting from 2008? Which are the challenges and opportunities within this Market? What is expected for the future?*

As mentioned before, plenty initiatives have been carried out at a European level to tackle NPL endemic problem, here down below are reported the major provisions adopted:

#### **Basel Agreements**

The Basel Committee, Banking Supervisory Committee devoted to grant global financial stability, it has continued to define increasingly stringent policies as long as regards capital reserves for Financial Institutions.

In the years following the financial crisis, in 2008 with Basilea II and in 2010 with Basilea III new provisioning policies were put in place to face up potential future losses.

Starting with the basic Capital Requirement in 1988 with Basel I, namely the need to shelve 8% of the total credit equivalent into capital reserves; passing through the introduction of ratings to evaluate the counterparty risk and so to shelve capital according to this risk with Basel II; until reaching Basel III by adding further precautionary buffers.

Setting aside ever greater capitals laid the groundwork for a stronger financial system to avoid that a situation similar to 2008 arises again, granting to Banks adequate levels of capital resources to perform regular lending activities.

Basel Guidelines had however an effect on new exposures and none on the already high pillar of NPL, instead they pushed Banks to get rid of past bad exposure, because higher levels of capital requirements stand for a greater weight for NPLs in Banks' guts.

Banks that were so forced to engage into targeted actions to free their balances from these "deteriorated ballast" as we see in the following paragraphs.

Recently, on the 10 of June 2021, the Committee started to raise concerns regarding digital assets and if and how they should be considered in Financial Institutions' safeguard balance sheet policies. This consultation, to which a final response would be given in September, it is very severe in considering crypto potential losses. As it is synthetized in the chart below)

An overview of the prudential treatment of cryptoasset exposures

Table 1

Prudential requirements	Group 1 cryptoassets (fulfilling classification conditions)		Group 2 cryptoassets (not fulfilling classification conditions)	Out of scope
	Group 1a: Tokenised traditional assets	Group 1b: Cryptoassets with stabilisation mechanisms (ie stablecoins)	Cryptoassets that do not qualify as Group 1 (eg bitcoin)	Central bank digital currencies
Credit and market risk requirements	Capital requirements at least equivalent to those of traditional assets (with further consideration for capital add-ons)	New guidance on application of current rules to capture the risks relating to stabilisation mechanisms (with further consideration for capital add-ons)	New conservative prudential treatment based on a <b>1250%</b> risk weight applied to the maximum of long and short positions	N/A
Other minimum requirements (leverage ratio, large exposures, liquidity ratios)	Application of the existing Basel Framework requirements with additional guidance where applicable			N/A
Supervisory review	Additional guidance to ensure that risks not captured under minimum (Pillar 1) requirements are assessed, managed and appropriately mitigated (including through capital add-ons)			N/A
Disclosure	New requirements for banks to disclose information regarding cryptoasset exposures on a regular basis			N/A

(Source: Global banking regulator urges toughest capital rules for crypto -FT, published on the 28th of June 2021)

Basically, it would foresee for cryptocurrencies as Bitcoin (without stabilization mechanism), a Risk Weight of 1250%, imposing in this way Banks to shelve one dollar for each dollar of Blockchain detained by the Bank.

Banks that want to engage in offering custodial services or cryptocurrency-based products to their clients would be exposed to tremendously huge capital reserve to shelve.

Given these premises it is difficult to tell today whether this consultation would lead to a deterrence for Banks in approaching digital assets or it is the beginning of the legitimization of it, from the most prominent financial authority recognized worldwide.

## IFRS 9

IASB (International Accounting Standards Board), institution in charge to issue international accounting principles in 2014 promulgated IFRS 9 new principles, substituting the ones of IAS 39. (With compulsory implementation starting from 2018).

IAS 39 had been pointed out to be one of the causes of the financial crisis, as these principles brought delays in detecting losses on credits; especially due to the degrees of freedom in choosing models to report in the balance sheet the value of the financial exposure. (Specifically for the excessive usage of "Fair-value").

New principles synthesized in IFRS 9 brought to a more effective and prompter detection of expected losses than in the past, strengthening the capital to face future expected losses.

The introduction of the SPPI test "solely payments of principal and interest on the principal amount outstanding" was the major cause of this capital increase. Due to this test Financial Institutions were obliged first to evaluate the credit position according to the expected discounted cash flow without recurring to collaterals; being in this way restricted for them the usage of Fair Value. That could be chosen just after an Impairment Test with the result of this test.

IFRS 9 led to a significant change in NPL's management logic, institutions were pushed to insert in their key performance indicators new watchlists to grasp early indicators to identify UTP to restructure or dispose them timely.

## ESFS (European System of Financial Supervision)

Since 2010 the European System of Financial Supervision, both for countries belonging to European Union and both for those belonging to the Eurozone intensified.

Starting from that year a new Financial Supervision was constituted, the ESFS (European System of Financial Supervision) to ensure a centralized Framework to cooperate with Financial Institutions Regulations, without having to go through the transposition of National Guidelines.

This new system is in turn composed by the following institutions which cover different areas in ruling the European Banking Union:

- ESRB (European Systemic Risk Board)
- EBA (European Banking Authority)
- EIOPA (European Insurance and Occupational Pensions Authority)
- ESMA (European Securities and Markets Authority)
- National Authorities of each Country

With the establishment of the SSM (Single Supervisory Management) in 2014 and then the SRM (Single Resolution Mechanism) in 2016 to intensify stability in the Financial European System, Systemic Banks began to be supervised directly from the ECB (European Central Bank).

In this way the ECB granted direct support in preserve the robustness of Financial System in our continent by periodically monitoring Credit Institutions.

Every year indeed, the EBS conducts the so called SREP (Supervisory Review and Evaluation Process) for each Bank, evaluating the adequate approach in managing the risk concerning their own NPLs; the following elements are so judged: Strategies, Governance Structures and Processes in managing this kind of financial exposures.

This direct monitoring has undoubtedly put under great pressure Financial Institutions in our Country, which suffering from a more sluggish juridical system (in comparison with our European Partners) in resolving process processes related to NPLs, they were forced in many cases to securitize many of their positions to cope with increasingly capital constrains dictated by the SREP.

### **Monte dei Paschi case study.**

Emblematic is the Monte dei Paschi di Siena case, that in all probability suffered to a larger extent NPL phenomenon and the consequent stress test imposed from the EBA. Monte dei Paschi di Siena is one of the ancients Banks in our Country, its history started in the late 1472 in the Grand Duchy of Tuscany, went through a solid national consolidation from 1861 and an international expansion in the major financial centers in the mid-1900s until reaching nowadays, characterized by a strong concern of insolvent credits in their balance sheet.

In the already problematic scenario in which Italian Banks found themselves in 2015, year in which we reached the highest peak of NPLs (351 billion €), MPS held the worst position among all the Credit Institutions. As can be shown from the Sieneze Bank's NPL ratio in that year, namely 21.69%, against the 17% of the already alarming Italian average. After the stress test sustained by the ESRB (European Systemic Risk Board) in July 2016 to whom the Bank tried to react through an unsuccessful attempt of capital increase in the December of the same year; the Bank was forced to lighten its terrible balances through the greatest securitization transaction never endorsed before, not just by an Italian Bank, but even at a European level.

The Tuscan Bank in 2018 accomplished this maxi-securitization process with the support of notorious Banks and Servicers' partnerships:

- Banks: Deutsche Bank, Mediobanca Banca di Credito Finanziario, JP Morgan, dal team HSBC e Crédit Suisse.
- Master Servicer: Credito Fondiario.
- Servicers: Cerved/Juliet, Italfondiario, Prelios e Credito Fondiario

The securitization brought to the disposal of a credit package which value amounted to a GBV of 24.1 bn € for a price of 5.5 bn €, that is 21% of the gross value, through the usage of the GACS mechanism. This disposal for the sake of financial stability of the Institution, it led the institution to survive, but on the contrary, it led to record a huge loss, which in ultimate analysis it impacted on shareholders.

## Temporary loosening of these measures

In the context of the Economic and Social crisis caused by Covid-19, BCE extraordinary granted a certain level of flexibility in classifying debtors in good economic health (before the pandemic), but in temporary financial distress. Even though these measures give fresh air for Debtors, it could be a double edge sword, because it could hide economically sick players and just postpone the classification of their positions as NPLs.

(As emerged in the ECB's report: *"Identification and measurement of credit risk in the context of the coronavirus (COVID-19) pandemic"* published on the 4 December of 2020)

These concerns are starting to become tangible, since are emerging signals of this plausible deterioration as recently reported by Moody Rating Agency:

"The sustained improvement in the Italian banking sectors' loan quality is set to end, as non-performing loans (NPLs) are expected to rise in the next 12 to 18 months as the expiry of coronavirus-related repayment moratoria triggers an increase in borrower defaults" as reported Moody's Investors Service in the report, published on the 1 of June 2021.

We have indeed been witnessed of an essential "Stand-By" of these new deteriorated inflows, flow that would be significant in the years to come.

## Mechanisms for credit disposal.

Beyond these measures, introduced by EU authorities and so Italian ones, aiming to restructure financial stability for the years to come, it was necessary to take tailored actions to lighten Banks' balances from NPL's weight.

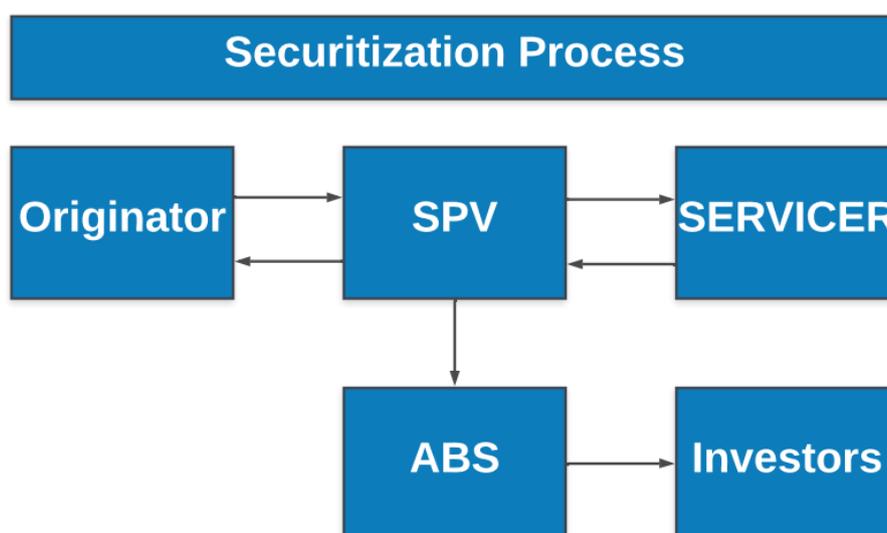
## Securitization

Securitization is a kind of financial activity, that allows the holder to turn a credit or a group of them into negotiable debt securities, shifting by a high illiquid financial instrument to one more marketable, the so-called ABS (Asset Backed Security). In Italy, this kind of financial activity is enforceable and regulated by the Law 130 of 1999.

In the Securitization process these actors are involved: the original creditor (Originator), the transferor (SPV, special purpose vehicle) and who underlies the note (the investor).

Usually, Securitization occurs gathering Assets (in case of NPLs, deteriorated Loans) in a Portfolio, or similar financial activities that can generate periodic inflows. The first step, from the Originator side, is the selection of which assets to pack up to build such Portfolio. The second one is the disposal, normally in the "pro-soluto" form, of such credits' pack to a SPV (Special Purpose Vehicle), which is an ad hoc constituted Company.

The SPV incurs Debt Securities, which typically have an ABS" Asset Backed Security" nature, having in most of the cases real estate or industrial assets as collaterals of these notes. These bonds to date are bought exclusively by institutional investors highly specialized that in return obtain repayments both in the form of interests and in the form of capital (In the simplest case).



This is indeed the "basic" model to apply Securitization, but more sophisticated typologies of Securitization are awarded worldwide and in the Italian juridical system. (Synthetic, Revolving, Conduit and Repackaging (CDO))

One above all, significantly interesting it is the so called "Revolving Securitization"; Securitization which always involves the issue of ABS securities but formed by two distinguished periods.

In the first period, the revolving one, underwriters receive only interest on the credit, while the inflow corresponding to the capital repayment is addressed to the SPV to purchase new assets. The second one, the amortization period, at the maturity of the fund inflows corresponding to the capital are also paid back to underwriters.

## Bid-Ask price Gap

In the disposal of NPL through securitization, the pricing process is worthy to be analyzed since Banks and Investors have trade's expectations significantly different, in such that the so called "Bid-Ask" gap is particularly deep. This phenomenon leads in ultimate analysis to a low number of transactions and consequently to a slow Market Growth. Credit institutions base their negotiations for NPLs' disposal on the NBV (Net Book Value) of them, which represents the value of these sufferings in the balance sheet, value below which it results a loss in the Income Statement. Investors' expectations on prices are usually far cry lower compared to this threshold, given the embedded risk in this Investment typology.

- **Credit recovery time and IRR (Internal Rate of return)**

These two factors are mutually dependent and directly impact on the negotiation among the Bank and the Investor, contributing to soundly expand the Bid-Ask Gap.

Recovery time plays a crucial role in the determination of NPL's price since it is inversely proportional to the expected time for credit recovery. This happens for two main reasons: necessary capital reserves, the more the NPL remains in the banking assets, the longer it will be necessary to shelve resources as required by Basel Guidelines to face their risk. Secondly as the time passes, the likelihood to collect entirely or partially the credit diminishes.

<i>Recovery Time</i>	<i>Total</i>	<i>Of which: Secured</i>	<i>Of which: Unsecured</i>	<i>Of which: Companies</i>	<i>Of which: Families</i>
<b>&lt; 1 Year</b>	60.6%	77.8%	51.7%	57.2%	60.2%
<b>1-2 Years</b>	54.1%	70.8%	44.8%	46.8%	60.4%
<b>2-3 Years</b>	50.1%	60.8%	41.2%	40.6%	58.9%
<b>3-4 Years</b>	43.9%	53.2%	35.3%	37.8%	52.6%
<b>4-5 Years</b>	41.1%	52.5%	32.2%	35.3%	50.6%
<b>&gt; 5 Years</b>	29.8%	38.8%	23.7%	27.8%	38.2%

(Source: *Recovery Rates of Banking Sufferings*, F. Ciocchetta – F. M. Conti, Banca d'Italia, 2017.)

IRR (*Internal Rate of Return*) has a significant impact in the negotiation, effects increasingly heavy as the time goes by. This is the rate through which expected flows arising from credit exposures are discounted and indeed have an impact on the expected price both for Banks and Investors. For Banks IRR is typically much lower than for Investors because IRR it is for the formers in function of their cost of capital, that for Banks is relatively low. Instead, investors apply an IRR much higher, given that for them it is in function of a high-risk investment activity.

<i>Recovery Time</i>	<i>Price (% on NBV)</i>
1	36.3%
2	36.3%
3	36.3%
4	36.3%
5	36.3%
6	36.3%

(Source: “How much are NPLs worthy?”, L. G. Ciavoliello – F. Ciocchetta, Banca d’Italia, 2016.)

- **Information Asymmetries**

This factor is particularly relevant for Secured and complex NPLs, since the information underlined them are very obfuscated and difficult to be interpreted, especially as regards Real Estate Collateral Documentation. In some cases, even Banks do not have precise information about the collaterals underneath their Credits, since for instance the repossession of the collateral itself may be in function of on-going legal proceeding or of on-going decision-making processes of local authorities.

These conditions leave room for the classical Contract Theory case: “**The Market for Lemons Context**, paper by the well-known economist George Akerlof”. From one side, since Buyers are afraid to know less about NPLs’ information they prone to offer a low price; on the other side the Seller, being able to trade poor assets (lemons) would do so, disguising them as peaches (good quality ones).

In such context, trades would take place only among players which trust each other that have incentives to continue to play these trades in the future; establishing in this way a sort of NPL’s Cartel among Seller and Buyers. To enable this Market first to new participants and secondly to a secondary Market, it would be necessary the emergence of a Standard, as this report will analyze in the Methodology of this Report.

- **Portfolio Segmentation**

Given that in most of the cases Securitized NPL Portfolios have more than one financial position in itself; Banks must take strategic decisions in composing them to attract as much as possible potential Investors. The Portfolio Segmentation could happen according to different dimensions belonging to the NPL: unsecured vs. secured; collateral type; Real Estate Collaterals Locations and potentially many more.

It could be the case in which an Investor is interested only to a fraction of the Portfolio, according to its own investment strategy, but it must quit the negotiation because it is a block trade.

With Blockchain Technology fractionability of the Token would be potential enabled according to heterogenous dimensions, giving more degrees of freedom to the Investor; contributing to reduce the price gap.

- **Balance Sheet Policies**

By analyzing these patrimonial policies and their consequential coverage ratio (that is a measure of capital shelved to face potential unexpected losses), it is observable that they have a directly impact on the disposal price. Banks will evaluate the disposal of such suffering assets considering the potential loss that would arise by disposing the position at a price lower than its nominal value.

They would do it only if they have sufficient capital reserves to face such losses, it results indeed that only the most virtuous Banks in respecting and anticipating capital requirements would engage and conclude this kind of negotiations.

## GACS

GACS is an instrument introduced by Italian State on the 14 February 2016 aimed to cure the “Bid-Ask Gap” inefficiency within the NPL Italian Market. The acronym GACS stands for “Garanzia sulla Cartolarizzazione delle Sofferenze” and it is precisely a guarantee that the Italian State was able to assign to some typologies of NPL Securitization to turn the Market more liquid; in particular, there was the chance to apply this grant on the “best” tranches namely those ones evaluated by specific and independent certifiers, as “Investment Grades”.

Banks had the opportunity to decide whether to activate or not the GACS for their Securitizations, which would have cost a premium to pay to the State and the compulsory introduction of a Servicing Company (nominated by Banca di Italia) for the Securitization process and to monitor inflows coming from such instruments.

This solution of government “light” intervention, agreed with European Commission, it departed much compared to the more direct intervention mechanism that our European Partners were able to apply (which despite ourselves was forbidden), that is the constitution of a “Bad-Bank”.

As it was the case of Ireland and Spain, respectively with the creation of Bad-Banks: NAMA and SARE; thanks to which they were able to gather the majority of NPLs of their respective countries and to convey them in a unique “suffering” Bank which major shareholder is the State. To manage this systemic financial problem with a “centric” solution in which focalize all the necessary competences and efforts to recovery the largest amount possible of financial resources, being financially supported by the State. So, in ultimate analysis by charging NPLs to contributors.

Even though GACS is a lighter instrument than the constitution of a “Bad-Bank” it has undoubtedly helped to give a boost to the Italian NPL Market.

From the table below it is possible to analyze the main transactions of NPLs that relied on this State guarantee until the end of 2020, which cumulated from the beginning of its introduction it has brought to the Securitization of NPLs for an amount of 74.1 billion € of GBV.

Main banks involved	SPV	Servicer	Issuing date	GBV (€ / bn)	% Secured	Rated Notes (at nominal value)					Buyer
						Senior (% GBV)	Mezzanine (% GBV)	Junior (% GBV)	Senior Yield (%)*	Mezzanine Yield (%)*	
Banca Popolare di Bari	Popolare Bari NPLs 2016 S.r.l.	Prelios	Aug-16	0.5	63%	26%	3%	2%	(0.0%)	5.5%	n.a
Carige	Brisca Securitisation S.r.l.	Prelios	Jul-17	0.9	77%	28%	3%	1%	0.1%	5.5%	n.a
Creval	Elrond NPL 2017 S.r.l.	Cerved	Jul-17	1.4	74%	33%	3%	1%	(0.0%)	5.5%	Waterfall Asset Management
UniCredit	FINO 1 Securitisation S.r.l.	doValue	Nov-17	5.4	52%	12%	1%	1%	1.0%	4.6%	Fortress
Banca Popolare di Bari	Popolare Bari NPLs 2017 S.r.l.	Prelios	Dec-17	0.3	56%	25%	3%	4%	0.0%	5.5%	n.a
MPS	Siena NPL 2018 S.r.l.	Cerved, Prelios, doValue, Credito Fondiario	Jan-18	24.6	49%	13%	3%	2%	1.0%	8.0%	Italian Recovery Fund
Creval	Aragorn NPL 2018 S.r.l.	Cerved, Credito Fondiario	Jun-18	1.7	75%	30%	4%	1%	(0.0%)	6.5%	Investitori istituzionali
Banco BPM	Red Sea SPV S.r.l.	Prelios	Jul-18	5.1	77%	32%	3%	1%	0.1%	5.5%	n.a
BPER	4Mori Sardegna S.r.l.	Prelios	Jun-18	1.0	53%	22%	1%	1%	0.4%	7.5%	Investitori istituzionali
Banco Desio e Brianza	2Worlds S.r.l.	Cerved	Jun-18	1.0	72%	29%	3%	1%	(0.1%)	7.5%	n.a
ICCREA	BCC NPLs 2018 S.r.l.	Prelios	Jul-18	1.0	72%	27%	3%	1%	(0.1%)	5.5%	n.a
Cassa di Risparmio di Asti	Maggiore S.r.l.	Prelios	Jul-18	0.7	63%	24%	3%	2%	(0.0%)	5.5%	n.a
BNL (BNP Paribas)	Juno 1 S.r.l.	Prelios	Jul-18	1.0	30%	14%	3%	0%	0.1%	7.5%	Investitore Istituzionale
UBI	Maior SPV S.r.l.	Prelios	Aug-18	2.7	47%	23%	2%	1%	(0.0%)	5.5%	n.a
Banca Popolare di Ragusa	Ibla S.r.l.	doValue	Sep-18	0.3	82%	24%	3%	1%	0.1%	7.5%	n.a
BPER	Aqui SPV S.r.l.	Prelios	Nov-18	2.1	60%	26%	3%	1%	(0.0%)	6.5%	n.a
Banca Popolare di Bari	POP NPLs 2018 S.r.l.	Cerved	Nov-18	1.6	66%	27%	3%	1%	0.0%	5.5%	n.a
Carige	Riviera NPL S.r.l.	Credito Fondiario, doValue	Dec-18	1.0	39%	18%	3%	1%	0.1%	6.5%	n.a
ICCREA	BCC NPLs 2018-2 S.r.l.	doValue	Dec-18	2.0	58%	24%	3%	1%	0.0%	5.5%	n.a
Banco BPM	Leviticus SPV S.r.l.	Credito Fondiario	Feb-19	7.4	67%	19%	3%	3%	0.1%	7.5%	Elliott
BNL (BNP Paribas)	Juno 2 SPV S.r.l.	Prelios	Feb-19	1.0	61%	21%	5%	1%	0.1%	7.5%	n.a
UniCredit	Prisma SPV S.r.l.	doValue	Oct-19	6.1	64%	20%	1%	0%	1.0%	8.5%	SPF Investment Management
UBI	Iseo SPV S.r.l.	Credito Fondiario, doValue	Dec-19	0.9	92%	39%	3%	2%	(0.0%)	5.5%	n.a
ICCREA	BCC NPLs 2019 S.r.l.	doValue	Dec-19	1.3	66%	27%	4%	1%	0.0%	6.0%	n.a
Banca Popolare di Bari	POP NPLs 2019 S.r.l.	Prelios, Fire	Dec-19	0.8	47%	21%	3%	1%	0.0%	9.0%	n.a
BPER	Spring SPV S.r.l.		Jun-20	1.4	52%	23%	1%	0%	(0.0%)	9.0%	n.a
Banca Popolare di Sondrio	Diana SPV S.r.l.		Jul-20	1.0	65%	24%	4%	0%	0.0%	8.5%	n.a
	<b>Total</b>			74.1							
	<b>Weighted average</b>				58.2%	19.7%	2.9%	1.6%	0.5%	7.0%	

(Source: The Italian NPL Market the Calm before the Storm – by PWC published in December 2020)

Given the success of the instrument, its enforceability was already extended in 25/03/2019 for further 24 months, with the opportunity to add other 12 months. It is therefore realistic to think, that if the outlooks of NPLs increase will come true, it will be renewed even the opportunity to resort to this instrument.

#### 1.2.4. NPL Market's Features

##### Market Participants.

##### Banks

Banks are institutions in which deteriorated credits are generated and so are managed in the first place, they can therefore choose among an internal management, an external one or a hybrid approach.

Internal management involves in arranging an NPL unit within the Banking Organization, to launch specific processes of "Loan Restructuring" and so being able to improve their financial performances.

The positive aspect of this solution it is the maximization of Credit Recovery, which in turn implies long time in collecting it, leaving it to burden for a long time on bank's balance, compromising the credit capacity.

In addition, to structure dedicated units to manage these credits inhouse are necessary specific competences that even impact on the bank's balance, making in this way the internal management of NPLs prerogatives of big Banks.

An example of internal subunit that we find within NPLs' Unit it is the so called REOCO unit, acronym that stands for Real Estate Owned Company. (A Firm constituted by Real Estate properties directly controlled by the bank or a specialized investment fund)

REOCO are peculiar SPV (Special Purpose Vehicles) generated with the intent of maximize the value of Properties placed as guarantees of NPLs, teams that manage them are indeed consisting of several experts: lawyers, architects, engineers etc.

These real estate collaterals, after a bankruptcy procedure are put into auction and the objective of the REOCO it is to sustain their value in this place. This "price support" happens by assessing an indifference price, maximum price bid by the REOCO to repossess the asset, above which the REOCO is satisfied to let a third party to purchase the asset. The REOCO in this way would gain the sum offered by the third party. If this indifference price is not reached the asset is repossessed by the REOCO, that will have to pursuit development and commercial activities to sell it for a fair value.

(When the REOCO awards a Real Estate in auction, in ultimate analysis it does not have an actual outflow corresponding on the overall price bid, because the price is paid to the holder itself that is the Originator that is at the same time owner of the REOCO itself. There is only a cash-flow which corresponds to a percentage of the minimum offer in auction (generally around 10%, depending on the court), that remain frozen in Court till the price balance, which typically occurs in 90 or 120 days).

The most practical option remains the Disposal of these sufferings, through the direct sale or Securitization of them to specialized investors. Simple alternative, but with a drawback, that is the impact on the Recovery Rate, having to sell these credits with a significant discount on the NBV, for the sake of time reduction and the lightening of Asset-Side from their sufferings.

The hybrid Management is the most effective one, it is possible to dispose these credits enabling a "Join Venture" between the Bank and Specialized Investment Fund through the Securitization of these Credits. In this way advantages of internal and external approaches are pursued at the same time.

## NPL's Servicers

Servicers are Companies which deal with NPL's Management, highly specialized in credit recovery processes, which contribute to enhance and manage NPL's Portfolios for Credit Institutions and Investors. We can somehow define them as the Market Makers of the NPL's Market because they are used at the same time both from the Bid Side, generally Banks, and from the Ask Side, Investment Funds.

Different typologies of Servicers exist in the market, specialized in heterogeneous phases of NPL's lifecycle.

## NPL Management Phases & Players:

- **NPL Ownership:** This is the sale phase of the credit, that basically happens through the securitization mechanism. In this phase it is usually offered a "Marketing" service to combine Banks and Investors, in which Servicers try to identify on behalf of Investors the so called "Best Deals" and Banks to sale at the best price. This happens through specific Initial Due Diligence Services distinctly provided for both sides by different Servicing Companies, to avoid eventual conflicts of interest.
  
- **Advisory and Strategy:** In this phase the Servicing Company supports players of this Market in defining the Strategy and so the Business Plan Drafting to optimize inflows arising from the deteriorated credit position. Behind this strategical phase, proper due diligence processes are essentials since a correct Strategy could not be implemented starting from bad quality or wrong information as it is demonstrated by the well-known GIGO logic "*Garbage in Garbage Out*". In this phase we could identify three main players (Due Diligence Advisory and Strategy; Master Servicer; Real Estate Advisors):
  - **Due Diligence Advisory and Strategy**

Players involved in this initial phase, play a crucial role both in structuring the portfolio for Sellers and to support Buyers in the acquisition process. Here below a non-exhaustive list of services provided for each side it is represented:

<b>Seller Side:</b>	<b>Buyer Side:</b>
▪ Structuring the data tape	▪ Portfolio sampling for Due Diligence
▪ Portfolio Segmentation according to potential Investor base	▪ Financial modelling
▪ Analytics on recovery performances	▪ Coordination of parties involved in the DD process
▪ Simulations on different Recovery scenarios	▪ Portfolio pricing assessment
▪ Portfolio pricing	▪ Analysis of transaction Risk
▪ Selection and review of potential Investors	▪ Sensitivity analysis
	▪ Support in the Negotiation Phase

- **Master Servicer:**

They are those players specialized in undertaking those duties of a regulatory nature and so in charge to be compliant with the regulator, in the Italian case Bank of Italy, monitoring the Securitization process of the credit and the operativity of collection from it. One vertical example in the Italian landscape, specialized in offering master services, it is Centotrenta Servicing S.p.a., which from 2012 is enabled by Bank of Italy to offer such Services, in compliance with the Securitization Law 130/1999, which enables the securitization activity in our Country.

- **Real Estate Advisors:**

Real Estate Advisors are those agents which carry on the exploitation of real estate collaterals underneath the credit, starting from the definition of a Strategy and furtherly managing operations. In addition, they can even support the Master Servicer in assessing the “Fair Value” of the credit, according to the evaluation of the Real Estate Property, acting as external authorized certifiers. An example to be mentioned in the Italian landscape is Prelios an NPL servicer, specialized in Real Estate Collaterals.

Prelios is a corporate which handles through 360 degrees the Real Estate World in Italy, providing different kind of services: Asset Management, Credit Servicing and Real Estate Integrated Servicing.

They recently created their own securitization platform, Blinks, through which they offer Market Participants a digital environment to trade NPLs. Recognizing the need of the industry to create such platform, to tackle actual market inefficiencies that otherwise would prevent the creation of a secondary market and would enlarge the bid ask gap that already exists on the primary one.

Although this platform aims to increase the efficiency of the Market, by providing standardized data tape and a leaner digital process in engaging demand and offer, it would increase concerns related to its centralization. As we will furtherly analyze comparing this solution with BlockInvest one, which somehow similar, but in contrast has the advantage of decentralization. (importanza di un servicer non centralizzato per eventualmente passare da un servicer all'altro) (30/35 giorni per concludere una trattativa)

- **Credit Collection:**

Phase in which operationally Servicers contribute to debt collection, with customized activities for each credit position. In this phase we distinguish two macro categories of agents: NPL servicers and DCAs (Debt collection agencies). The first typology of Servicer is composed by highly specialized profiles which provide high value added and so we can define it as “Skill Driven” approach, whereas the second one deal with the massive collection of such credits, with activities highly standardized and so with a “Labor Intensive” core business.

Activities carried on by these Servicers could furtherly be identified by another category: “Judicial vs. Extrajudicial”, depending on whether the credit collection happens recurring through a court sentence or with private arrangements. Distinguishing in this way six macro categories, as they are shown below:

			EXTRAJUDICIAL	JUDICIAL
LARGE TICKET	NPL Servicers	UNSECURED	Single Agreement Deferred Payments	Bankruptcies Distrains
		SECURED (Asset Repossession)	Extra-Judicial Transactions	Foreclosure Procedures Bankruptcies
SMALL TICKET		Debt Collection Agencies	Massive Standardized Home- Phone Collection	Distrains on Salaries, Wages or Blank Accounts

### 1.3. Digital Assets on Blockchain and NPL

*So far, are there any scientific research published in the literature, which explain how the Financial Industry may benefit from the Blockchain in Securitization's processes? Specifically, is there any academic material which deal with benefits that this technology may have in the NPL Market?*

In the last years, research focused on identify how and to what extent the technological innovation brought with Blockchain may positively contribute to increase efficiency in the financial industry, in particular Securitization processes, which still today are characterized by intrinsic inefficiencies and partially conducted on paper.

In scientific literature there are already existing several studies that show the potential benefits of this technological application in Securitization processes; among these ones, two of them are noteworthy to be mentioned in the purpose of this analysis:

- ***“Application of Blockchain in Asset-Backed Securitization”*** published by Meikang Qiu, Wenxuan Pan School of Management Science and Engineering Central University of Finance and Economics Beijing, China on the 25 of May 2020. (<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9123058>)

In this Paper, researchers have underlined inefficiencies of the traditional ABS (Asset Backed Securities) industry: information asymmetry, credit rating inaccuracy and scarce of liquidity. Then they introduced a new business model enabled by the technology to finally analyze a real case study of a DLT platform to issue ABS. That is LJR (Lianjiaorong) the first Chinese platform of this kind, that in September 2018 issued its first ABS, showing the achievement of the effective benefits introduced by the technology in the industry.

As a matter of fact, the platform offers the following services:

- Services in common with traditional centralized ABS platform, but optimized:
  - Cash flow tracking and monitoring
  - Service report generation
  - Automatic fund accounting and distribution
- Smart Services allowed by Blockchain:
  - Intelligent asset screening
  - Intelligent value evaluation
  - Intelligent supervision
  - Intelligent risk monitoring

Eventually this report demonstrated the actual benefits of Blockchain applied to ABS and how all the participants took advantages out of it; displaying moreover that there is room to further innovative implementations. This is breeding ground for the purpose of analyzing how digital assets may impact on NPL's

Market in Italy; since the NPL's Securitization process, despite with a high level of complexity, it belongs to the group of ABS.

- ***“Smarter banking: Blockchain technology in the Indian banking”*** published by Suparna Dhar and Indranil Bose, Singapore Management University on the November of 2020.

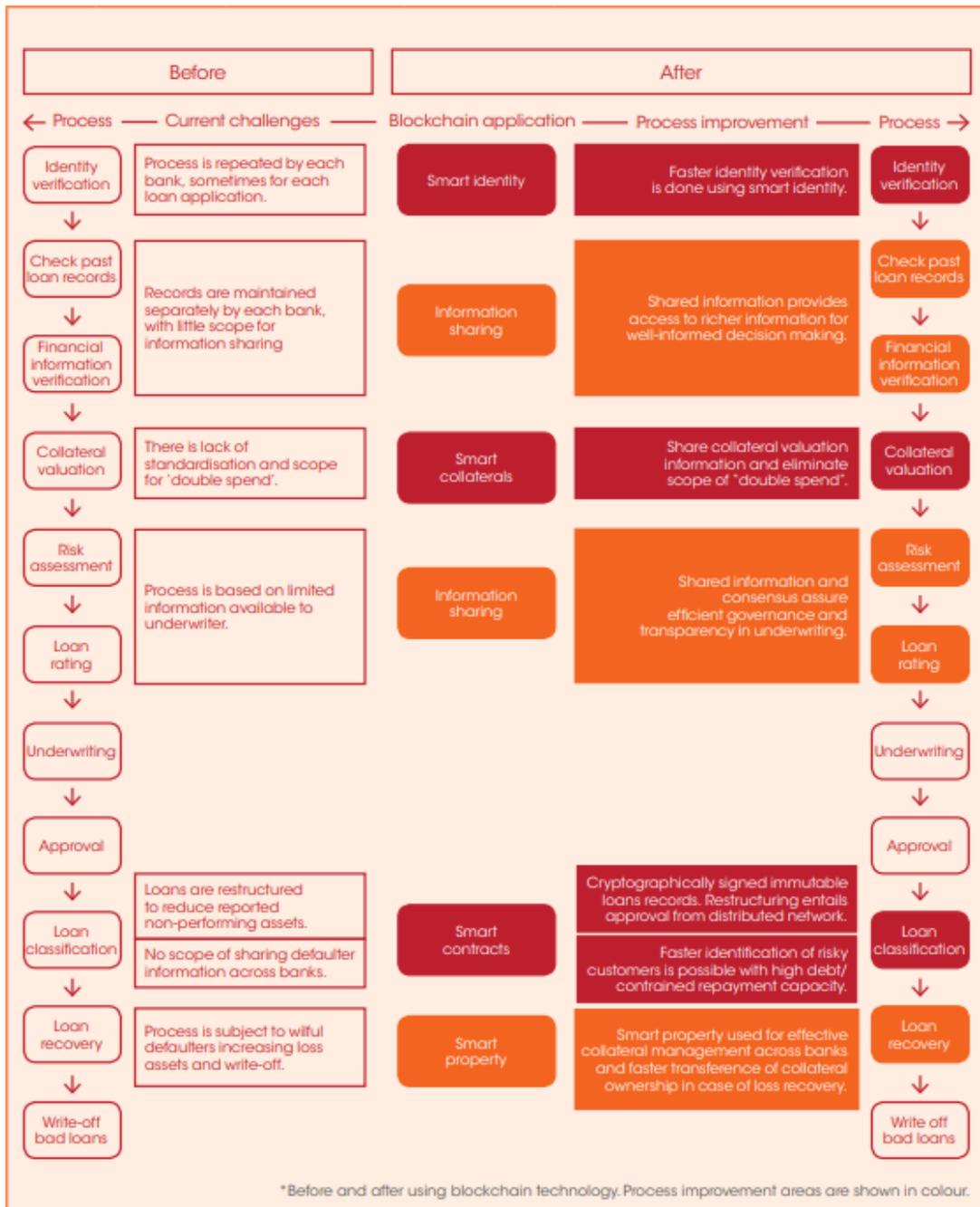
The Indian Banking System back in 2015 was heavily impacted by NPLs, living a situation comparable to the Italian one, having four trillion Indian rupee (the equivalent of 60 bn\$) of bad loans and an alarming warning from the IMF International Monetary Fund, in April of the same year, which reported that the 37% of debt issued by Indian banks was at risk while just 4.45% was reported by Indian Banking. In this light it was clear that number one problem to address for the Indian Banking system was asset quality management and Blockchain could be an effective help to this purpose.

The paper gives a rapid introduction of Blockchain going through the basic concepts of it (Crypto Currencies, Smart Contracts, Smart identities and so on) and it continues by pointing out the inefficiencies of the Indian Banking System.

To at the end presenting how Blockchain could intervene in the weak points of Loans originating, as it is illustrated in the scheme down below:



## THE MODIFIED LOAN MANAGEMENT PROCESS\*



This analysis does not thoroughly investigate how Blockchain could address the problem of NPLs once they have been generated, but it has an approach direct to the roots of the matter, namely by conceptually introducing a Loan origination directly on Blockchain, addressing in this indirect way NPL's problem. (Which if applied would have long term benefits, with poor results for already existing Loans)

<https://ink.library.smu.edu.sg/cgi/viewcontent.cgi?article=1011&context=ami>

Except these two mentioned papers, that indirectly address how Blockchain may impact on NPLs, up to date it does not exist an exhaustive scientific literature which deeply underlines this matter.

In this regard this research has the goal to analyze the advantages and potential drawbacks of this technological implementation in this challenging market, through the study of an Italian startup: BlockInvest. Company which is deploying a solution to tokenize real authentic assets, but it is currently specializing on an ad hoc solution for this niche Market; figuring out the enormous potential of it.

## 2. Methodology

*Why was BlockInvest chosen to analyze the literature's lack regarding Blockchain applied to the NPL's Market?*

BlockInvest was the first NPL's Blockchain platform which successfully accomplished the first tokenization process in Italy: "Operazione Barolo", in which 12.000.000€ UTPs exposures were tokenized, as we furtherly analyze. Process that other than be successfully under the technological point of view, it was also compliant under the legal perspective, demonstrating its applicability in the real NPL's Market. (Thanks to the duality that it grants in terms of property ledgers, being transactions registered both on Ethereum Blockchain and in traditional notary ledgers)

Another peculiarity which distinguishes this platform with its competitors, it is its flexibility in tokenizing different financial and non-financial asset typology; BlockInvest does in fact offer tokenization to all the assets which hold "authentic" documentation, being a 360° tokenization platform.

Even though right now they are focused in providing a targeted NPL's tokenization service, this broader approach is open to innovation; brand new "Securitization" services as well as new "early signal detection" processes (in detecting deteriorated positions) may emerge thanks to tokenization. Eventually providing a powerful instrument in tokenizing "Good Health" Loans and not exclusively NPL positions.

*Which were the steps followed to conduct such analysis?*

To carry on BlockInvest's analysis, in the first place all the material on the web site and on their LinkedIn, page was studied and elaborated. Secondly all the online video interview conducted to Lorenzo Rigatti, BlockInvest's founder, were analyzed, recording all the crucial elements of the initiative.

Starting from these two steps, and in the light of the literature review, a list of targeted questions (divided in five macro topics) was drafted to fill some materials lacks and deeply comprehend the Blockchain solution. These questions were asked during the interview to the founder, who exhaustively answered to them, permitting to cover all fundamental topics.

**Questions asked during the interview:**

BlockInvest Technology
<i>In which life cycle phase BlockInvest solution is applied? Can it be applied even to UTP unsecured, or it is thought just for a "terminal" phase of the suffering credit positions, in which the Servicer aims to repossess the real estate asset used as collateral to enhance as much as possible its value?</i>
<i>Which Blockchain technology is exploited by BlockInvest platform? Which features belongs to the token that represent the SPV? I would like to frame it through this "Comprehensive Crypto Asset Taxonomy":</i>

<b>Claim structure</b>	<b>No claim(s)</b>		<b>Flexible claim(s)</b>		<b>Fixed claim(s)</b>	
<b>Distributed Ledger Technology</b>	<b>Native token (Coin)</b>			<b>Protocol token (Token)</b>		
<b>Underlying</b>	<b>No Underlying</b>	<b>Company</b>	<b>Bankable asset</b>	<b>Cryptographic asset</b>	<b>Tangible asset</b>	<b>Contract</b>
<b>Ownership</b>	<b>Private</b>			<b>Public</b>		
<b>Consensus Mechanism</b>	<b>Instant Finality</b>		<b>Probabilistic finality</b>			
			<b>POW</b>	<b>POS</b>	<b>Hybrid</b>	<b>Other</b>
<b>Legal status</b>	<b>Regulated</b>			<b>Unregulated</b>		
<b>Governance</b>	<b>Centralized</b>			<b>Decentralized</b>		
<b>Information Complexity</b>	<b>Value</b>		<b>Contract</b>		<b>Turing completeness</b>	
<b>Legal Structure</b>	<b>No legal structure</b>	<b>Foundation</b>	<b>Note/bond</b>	<b>Share</b>	<b>Other</b>	
<b>Information interface</b>	<b>No interface</b>		<b>Qualitative</b>		<b>Quantitative</b>	
<b>Total Supply</b>	<b>Fixed</b>		<b>Conditional</b>		<b>Flexible</b>	
<b>Issuance</b>	<b>Once</b>		<b>Conditional</b>		<b>Flexible</b>	
<b>Redemption</b>	<b>No Redemption</b>		<b>Fixed</b>		<b>Conditional</b>	<b>Flexible</b>
<b>Transferability</b>	<b>Transferable</b>			<b>Non-Transferable</b>		
<b>Fungibility</b>	<b>Fungible</b>			<b>Non-Fungible</b>		

*Which is the Standard Data Tape that is exploited to keep track of NPLs, does it refer to some international standard of the Financial World?*

*May I require the details and additional material regarding the testing operations that were conducted thanks to BlockInvest? (Specifically, I am referring to the cases: "Operazione Barolo" e "Immobiliare Casati"). In addition, may I ask if you have underlined savings in terms of time and cost, compared to the execution of these two operations with traditional methodologies.*

#### **Interface with the public administration and legal side**

*Have you explored the opportunity to improve the information exchange, between Courts and Servicers, so impacting on time and costs reduction in credit recovery? (Considering the large room for improvement that we must reduce law proceedings in Italian courts)*

*Which are today the most serious challenges from the legal perspective in the implementation of BlockInvest in Italy?*

#### **NPL Management**

<p><i>+Working for a Real Estate Servicer internal to an investment fund and specialized in the NPL management (more precisely the REOCO unit), I noticed a strong problem of misalignment and communication difficulties among LOAN and REOCO units. (The first unit manage the NPL as such, the second one manages real estate collaterals, underlined to the NPL, when they are repurchased through the auction process).</i></p> <p><i>Information asymmetries which arise due to a managerial division, as the management is conducted by different teams which work with different information systems with a further complication the interaction with the judicial system. (Interacting with different Courts and local authorities). Have you also noticed this issue in managing the NPL's lifecycle, as you developed BlockInvest's solution? How can BlockInvest's platform integrate these two phases and the relationship with the public administration?</i></p>
<p><i>Who is in charge in managing the SPV, once the token is sold on the secondary market? Is it BlockInvest which primarily appoints an external Servicers, or it is voted by a qualified majority of token holders (as it happens in appointing the management of most of the Companies)? I am referring especially to those credits which real estate collaterals are enhanced with a complex development project; which include selecting the group of specialized experts to develop it?</i></p>
<p><b>NPL Market</b></p>
<p><i>How is Blockchain solution impacting the deep "Bid-Ask" Gap intrinsic in the NPL Market?</i></p>
<p><i>Which are the main reasons, the threats, that today keep put some private investors in entering this Market and how can BlockInvest facilitate their entrance?</i></p>
<p><i>The generation of a secondary market does not endanger getting the tokenization of just the "worst" NPLs? I am referring to the fact that considering close relations between financial institutions and specialized investment funds, there is potentially the risk that NPLs with best real estate collaterals go to them. (Cherry Picking) While banks tokenize more cumbersome and less appealing NPLs?</i></p>
<p><b>BlockInvest Development</b></p>
<p><i>In which way the "Broker Dealer" (or Transfer Agent) can optimize NPL's transactions? Have you already implemented this role on BlockInvest?</i></p>
<p><i>Have you already implemented New Machine Learning Models to foresee NPL's recovery rate?</i></p>

*Which are the partnerships both in terms of Financial Institution and Investors that you deployed?*

### 3. Results

#### BlockInvest

##### Introduction

BlockInvest is an Italian start up, founded by different experts with heterogeneous backgrounds in the following fields: Blockchain, Fintech, NPL and Real Estate.

The company provides through the usage of Blockchain the tokenization of tangible assets; real assets that are uniquely identified by real and authentic documentation. Binding in this way a real world's right to the Blockchain, making it run on a decentralized network, exploiting the concept of tokenomics.

*"Up to 10% of global GDP could be stored on blockchains by 2025, according to the World Economic Forum. From product identifiers, medical records to land registries, academic degrees, and insurance contracts, blockchain and distributed ledger technologies (DLTs) are already functioning in many sectors."* As reported in the article: *"Blockchain is not a magic bullet for security. Can it be trusted?"* published on the 19 of August 2019.

The objective of this startup it is not only to offer a tokenization service to optimize business processes, but the true mission is to provide Firms a tool to move away from already existing Business Logics, to create new Business Models and ultimately to reach new unexplored Markets, enhancing in this manner Digital Asset Investing, through a Blu Ocean Strategy.

This tokenization solution offered by Blockchain it is suitable for a variety of Industries, which share the usage of real authentic assets as fundamental prerequisites. Excluding in this way those intangible assets which are lacking a certified documentation to state for their underlined features and properties. (So, for example Gaming and NFT Industries will not be able to pursue it).

In this early stage of its life, the team is dedicating its effort to deploy a standard, for the financial sector for the NPL's area. (Even though the team is already planning to address many more fields: the Industrial World, Logistic Warehouses, Carbon Credits, ESG World and so forth)

Being it one of the most valuable markets to which apply this technology, given the intrinsic Bid Ask Gap of Bank suffering's Market; especially in the light of today extraordinary economic scenario caused by Covid-19:

*"BlockInvest's Target Market is the NPL's one, exceedingly difficult to be entered and managed; but with huge volumes, almost 170 bn€ only in Italy, that are expected to double up due to the pandemic situation. Market which still suffers of numerous bureaucratic inefficiencies as paper documentation, stamps and wide usage of the notary."* As reported Lorenzo Rigatti, BlockInvest founder, in the interview conducted on Fintech Advisor YouTube channel and published on the 10 of November 2020

Relying on Blockchain Technology, they deployed a standard to enable digital Securitization processes. Specifically, they deployed a standard to run NPL's Securitization; providing significant advantages for all the actors involved, both in terms

of process optimization and innovative solutions. For instance, this could be an interesting solution for Banks to finance UTPs, through alternative financing; instead of selling these credits through traditional securitization, severely discounting potential profitable positions that with the right measures could be brought back to financial health.

UTPs among NPLs are the prior target addressed by the Company in its early stage, since the recovery of our economy would be tremendously influenced by the healing of these crucial positions, that must return to generate value.

In the light of the objective of this research, this analysis will focus precisely on the usage of BlockInvest in the complex, but nonetheless full of opportunities NPL market.

### 3.1. BlockInvest Technology

In the first place it is necessary to analyze the technology at the core of this solution, to understand its functioning and so its tokenization process.

For the purpose of this analysis, it is helpful to frame the token and the underlined Blockchain with the Classification identified in the Literature Review, namely: “The Comprehensive Crypto Asset Taxonomy”. (Relying in this manner on the previously underlined benefits that this classification offered, in comparison with the ones previously analyzed; namely EBA’s Framework and Barclays one).

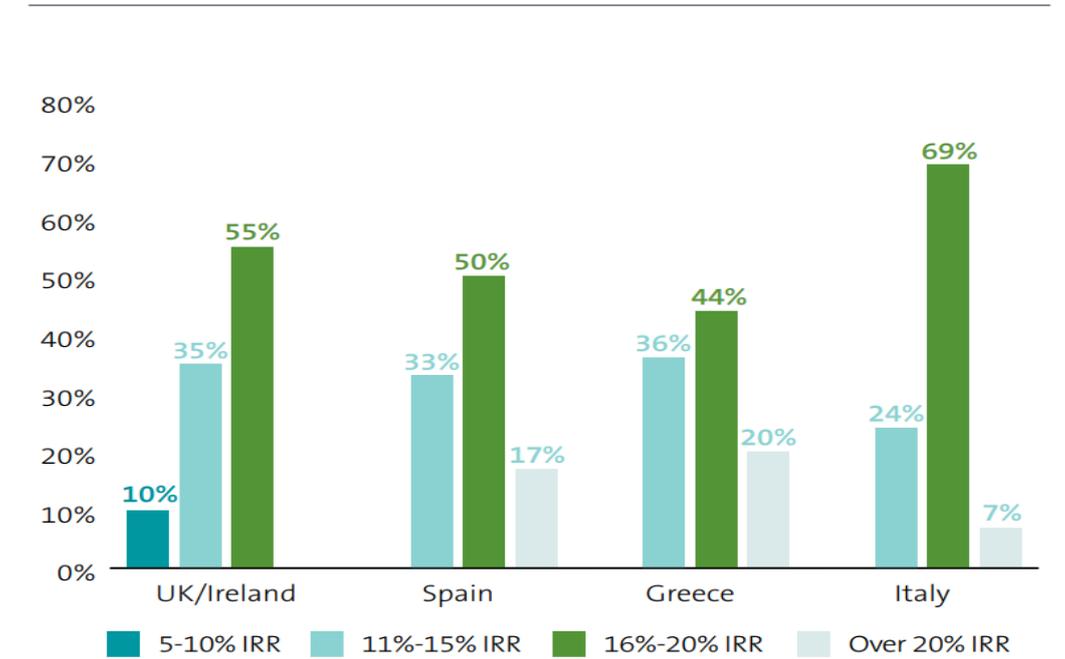
The following taxonomy classifies BlockInvest’s solution applied to NPL’s tokenization, being BlockInvest suitable for a variety of Assets. Indeed, if it is applied to another asset typology, for instance Carbon Credit, some of the token’s characteristics would obviously differ, given the underlying different nature.

Claim structure	No claim(s)		Flexible claim(s)			Fixed claim(s)	
Distributed Ledger Technology	Native token (Coin)				Protocol token (Token)		
Underlying	No Underlying	Company	Bankable asset	Cryptographic asset	Tangible asset	Contract	
Ownership	Private				Public		
Consensus Mechanism	Instant Finality		Probabilistic finality				
			POW	POS	Hybrid	Other	
Legal status	Regulated				Unregulated		
Governance	Centralized				Decentralized		
Information Complexity	Value		Contract		Turing completeness		
Legal Structure	No legal structure	Foundation	Note/bond	Share	Other		
Information interface	No interface		Qualitative		Quantitative		
Total Supply	Fixed		Conditional		Flexible		
Issuance	Once		Conditional		Flexible		
Redemption	No Redemption		Fixed		Conditional	Flexible	
Transferability	Transferable				Non-Transferable		
Fungibility	Fungible				Non-Fungible		

#### Flexible Claim Structure.

The **claim structure** of the token is flexible, given that the inflows arising from the NPL position depend on the effort of the Servicer in recovering funds from it. Even though there is the possibility to set a fixed return for less risky denominations. Generally, for this asset typology (NPL secured) Investors seek for an expected return of at least 15% (on Italian NPLs) given the higher risk associated to these financial instruments. (As it emerged in the report *A Global NPL Perspective*, conducted by Ashurst published in March 2019; of which we can see a chart which stands for the interests expected, according to the Country)

## INVESTORS, FINANCIAL ADVISORS: WHAT WOULD BE YOUR TARGET IRR IN RESPECT OF AN INVESTMENT IN SECURED NPLS IN THESE COUNTRIES/REGIONS?



(Source: A Global NPL Perspective— by Ashurst on the 5<sup>th</sup> of March 2019)

<https://bebeez.it/files/2019/03/Ashurst-A-Global-NPL-Perspective.pdf>

### Distributed Ledger Technology.

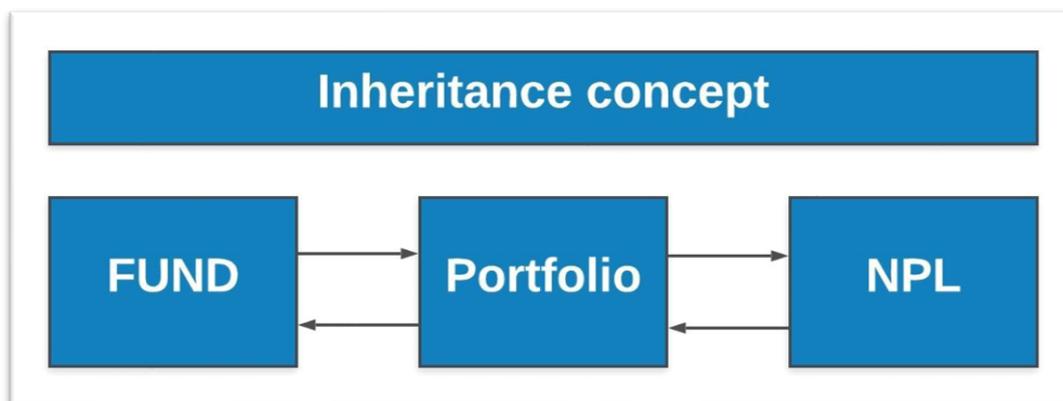
BlockInvest relies on the most used Blockchain for Decentralized Finance, **Ethereum**. However, it does not exploit the “mainstream” Ethereum tokenization standards, that are ERC20 and ERC721, but a sophisticated combination of 14-xx ones: 1400, 1410, 1411, 1462, 1594, 1643, 1644. Combination of standards like the one used by EIB to set up their first tokenized bond recently issued, as it has been illustrated in the first part of the literature review.

<https://consensys.net/blog/enterprise-blockchain/how-350m-worth-of-real-estate-was-tokenized-on-ethereum/>

Under these standards the token cannot be freely transferred, unlike the most common standards above, but to make it happen the **Transfer Agent** figure is needed; being in this way a “transfer block protocol” restricted to the notary role, to be compliant with the Italian Law in terms of property transfer.

The basic ERC20 and ERC721 standards (abovementioned in the literature review), although granting an easier adoption and management, they cannot be used to tokenize Security Tokens such as NPLs for compliance issues, being them freely transferable and so potentially prone to money laundering or capital flight.

Utilizing these set of standards, the token created by BlockInvest can take advantages of the **inheritance concept**; a pyramid scheme is so created on the Ethereum Blockchain through the concatenation of Smart contracts representative of real tangible underlings. To make a concrete example it is possible to create on the platform, not only the token representative of the NPL, but even a token which stands for the Portfolio that controls the Fund which in turn holds it.



In this way an SGR (*Società di Gestione del Risparmio, Investment Management Company*) which controls different funds can access different information about them and each single financial position under them, in a real time fashion on the same platform. Information accuracy of all these positions is ensured without any organizational effort in the complex reconciliation of information. Optimization which would enable enormous savings which are undeniable but are hard to estimate in terms of man hours and costs.

ESGR's time and costs should be monitored in the "as-is" situation, namely with the intrinsic inefficiency of centralized systems and compare them with the ones implied by the same processes leveraging BlockInvest solution.

Moreover, it would provide an assurance on information transparency, without having to rely on managerial good faith and best practices, which unfortunately it is not always the case. As it emerged from the well-known contract theory of Moral hazard, in which is well underlined that sometimes managerial and investor objectives are not synchronized, being the latter incentivize in obfuscating losses (or postponing them) taking advantages of the NPL's market and legal information complexity. (*The Theory of Moral Hazard and Unobservable Behavior: Part I by J. A. Mirrlees 01 January 1999*)

#### **Underlying, Contract.**

Given that each token is the representation of a NPL position, the underlying is simply the Contract itself from which arises such financial distress. Which in turn have as underlying a certain capital and interest repayment scheme and assets as collateral if it is a secured Loan. That are represented in turn according to the pyramid scheme relying on the concept of legacy (as it is illustrated above)

#### **Ownership, Consensus Mechanism, Governance, Information Complexity.**

Since BlockInvest's NPL Token relies on the Public Blockchain of Ethereum these DLT characteristics are directly inherited by it and so the token results:

- **Public Ownership.**
- **PoS (Proof of Stake)**
- **Decentralized Governance.**

- **Turing Completeness.**

### **Legal Status.**

The token is compliant with the current regulation to securitize NPL positions: for the issuance, redemption, and governance of the asset. The token itself is compliant, at least regarding the FINMA (Swiss Financial Market Supervisory Authority regulation), instead for the Italian Law there is still a lack of a specific norm which regulate it. However, being this platform coexisting with the traditional property ledgers, which are highly regulated; there is not any foreseeable obstacle in the application of such Technology neither today, neither in the future.

### **Legal Structure,**

Being the token the representation of the NPL, it has the same legal structure of the underlined NPL contract itself. It is the precise mirror image of the contract in the form of Digital Asset. Having the token, a mirror-like Blockchain legal structure of the traditional one.

### **Information Interface, (Qualitative)**

The Information Interface is qualitative: The Originator uploads NPL's contract information on BlockInvest's platform, then the transfer agent runs the actual securitization processes both on and off chain (to guarantee Law compliancy) and then the Servicer which is designed by the Originator it is in charge of updating information according to their own work in real time. Information interface is automatic only in the sense that information is automated reported between different entities on the Blockchain, for instance among the single NPL position and the portfolio.

### **Total Supply, (Flexible)**

The total Supply of tokens simply depends on the number of "Securitizations" issued through the Platform and moreover on the NPL's fractions obtained by each Securitization, so there is potential no limit to this Supply.

### **Redemption, (Conditional)**

The token could not be arbitrarily redeemed, its redemptions is conditional to the contract terms expressed in the NPL's contact underlined. So, for instance if the Debtor returns to Bonis paying all the due amount of Loan's capital and interests, the Crypto NPL contract would expire per se.

### **Transferability, (Transferable)**

The token ownership could be transferred to another party when it is generated; but it is not possible to simply have peer to peer transactions, they still must be certified by a Notary as required by the Italian Law.

This is the reason why BlockInvest introduced the figure of the **Transfer Agent**, role that must be covered by an authorized Notary, which authenticates the Transaction both on its Notary Ledger and on the Blockchain. Despite this could be seen as a loss of potential of the Blockchain Technology, namely its decentralized nature, it is indeed a tremendously important role implemented in this solution. In this way, Credit institutions have the possibility to apply today this solution; being compliant with the current Law. Without expecting that the State would recognize as compliant, transferring NPLs on a Blockchain ledger, managing at the same time to benefit from all the other advantages of the Technology to generate new Markets and to optimize managerial processes.

There is also a cultural aspect beyond compliancy that is important to underline, that is the established trust in the Notary figure that we have in Italy. In fact, managers in the banking sector prefer to rely on it, with its intrinsic costs and inefficiencies, compared to Blockchain Technology, despite relying just on an algorithm as an authenticator; probably due to a lack of knowledge on Blockchain Technology and consequently no political will to disrupt the Notary industry.

### **Fungibility, (Non-Fungible)**

Given that each token is the representation of a specific contract, it is by nature Non-Fungible as the NPL is unique, also the token will be unique. However, one of the challenges of the project would be the one to turn such instrument into partially fungible ones, increasing the liquidity of the market aiming to give the opportunity to investors to exchange fractions of their NPLs for an equivalent in value fraction of another asset.

## 3.2. Why is it a disruptive technology?

### 3.2.1. Portfolio Creation and Management

Nowadays the securitization process, it is very time consuming and complex, it leads Credit institutions, the Originators, to dedicate plenty of resources and time in setting up a Portfolio by pooling together a set of NPLs as much appealing as possible for investors.

This complexity relies in the fact that Banks use different formats for Loan contracts origination and in many cases these documents are paper records scanned and uploaded to different information systems, therefore creating a remarkable complexity in reconcile this information to prepare the ABS (Asset Backed Security)'s Securitization. For commercial mortgages have for instance to be considered a variety of heterogeneous qualities notes like promissory notes, loan agreements, deeds of trust and many more. So, to have a complete and reliable picture of the contract underlined to a NPL a variety of different documents it is necessary.

Not existing a standard to which comply in presenting information, data rooms are prepared "by scratch"; the output of such process often result too complex or on the contrary too weak to be interpreted by potential investors.

BlockInvest with its solution offers a **standard data tape** to securitize these products, respecting top-quality industry standards, guaranteeing consistency, coherence, and completeness. This standard as abovementioned in the literature review has been recently put under observation by the European Commission with the **TARGETED CONSULTATION ON IMPROVING TRANSPARENCY AND EFFICIENCY IN SECONDARY MARKETS FOR NON-PERFORMING LOANS**. *(To which BlockInvest will adjust its own when the legislator will express its Guidelines)*

Providing at the same time a set of instruments to run effective analysis; optimizing the Due Diligence phase, which is heavily time and cost consuming and accelerating the execution phase.

In this manner the industry is provided by a Standard which is easily integrable with any information system, given the interoperability of the Blockchain itself, guaranteeing on it a unique source of trust and so the basis for the creation of a secondary Market and being it a remedy of the intrinsic factors which led the creation of the prominent Bid-Ask Gap, namely:

- Credit recovery Time and IRR
- Information Asymmetries
- Portfolio Segmentation with a variety of dimensions, opportunity to set highly customized products
- Balance Sheet Policies

### 3.2.2. Market Accessibility and the Creation of a Brand-New Secondary Market

This sufferings' Market is distinguished by strong entry barriers and therefore by a challenging accessibility for most potential Investors. Normally ABS with such Bank's sufferings underlying are offered to "High Ticket" National Investors, which have already consolidated relationships with Credit Institutions, that are highly specialized in the management of these credit typology, having in house a set of needed competencies to manage them. An example for all is AMCO, one of the major players in the Italian scene, which in 2020 was managing 34 billion € of AUM; that today is subjected to controversy, being accused of anti-competitive behavior.

#### AMCO

AMCO (Asset Management Company) is a player specialized in the management of NPL positions, it is 100% controlled by MEF (Italian Ministry of Economy and finance); which at the end of 2020 was put in the spotlight by Bank Ifis's CEO Luciano Colombini due to its supposed anti-competitive behavior. Colombini in occasion of a parliamentary committee inquiry regarding Banks, on the 14 of December 2020; he declared:

*"AMCO is a hybrid of a legislative measure and a price constituted by the Market, in the NPL field it risks twisting prices with its bids. Today we are witnessing to the fact that when AMCO participates to NPL's negotiations all the other players disappear, because there is an unjustified 20% premium on all the negotiations"*

He basically accused AMCO to ruin NPL's Market at the expenses of taxpayers, being them in ultimate analysis to finance the Company.

On the contrary of specialized Servicers, numerous Banks, especially non systemics ones, cannot rely on such organizational structures and human resources specialized in their management; being forced to the disposal of NPLs with a significant discount on their NBV.

This make such Market particularly concentrated; it is sufficient to think about a player as Prelios (which just on its own controls the equivalent of almost 50 billion € at the end of 2020). Thanks to this concentration these investment funds have a considerable high bargaining power in the negotiation phase, drastically reducing the Recovery Rate and so the profitability for Banks.

Thanks to BlockInvest it is on the contrary possible to remarkably increase the number of authorized investors, it only takes few clicks to access the platform, without the need that any direct relationship among the Fund and the Credit Institution was previously settled.

In this manner the onboarding process of accredited investor is simplified and the foundations to create a secondary market are established, which could provide beneficial effects for all the Market participants other than the entrance of retail investors itself.

Moreover, since information asymmetries are reduced, by disclosing more transparent and standardized information there is a positive impact on trade's prices. Given that buyers are willing to pay more, knowing deeply what they are

buying; for Banks, this leads to an increase of the recovery rate that in turn increases the profitability on these disposals (to tell the truth, it reduces related losses).

### **Primary Investors' side**

First this technology would enable the entrance of international players in this National niche Market, given in fact the presence of a reliable standard to interpret all the documentation behind the Security and a lower marketing effort for Banks to engage them in such negotiation. Nowadays is infact particularly cumbersome for international Investors to come across these investment opportunities and eventually evaluate them. This is mainly due to the difficult interpretation of the document underling the contract since it is required a high specialization in understanding and rigorously evaluate Italian legal documents; being the legal risk undoubtedly the highest one that they fear. (As it clearly emerges in the "Doing Business Report" mentioned in the literature review.

Secondly given the creation of a secondary Market, primary Investors both national and international could benefit of the leverage effect; having the opportunity to sell parts of their NPLs portfolios on the secondary Market, collecting liquidity to continue to invest on the primary Market with new Deals to close.

### **Secondary Investors' side**

"Low Ticket" Retail Investors which are looking for passive returns would indeed have the opportunity to Invest directly in NPLs, with the possibility to pick specific NPL's positions arbitrarily; without the need to directly engage a negotiation with Banks (which requires specific legal and real estate competencies plus a sufficient amount of capital, which generally is not the case of the retail Investor) or to go through NPL's Investment Funds which typically presents several drawbacks for the Investor:

- **Lack of Transparency and Low Frequency Reporting Activities**, given the multitudes of data and documentation related to this kind of position, Funds constituted of NPLs in the best-case scenario provide quarterly reports for Investors and synthetized documentation; qualitative reports that unfortunately could be misleading for the retail investors that do not have the specific competences to evaluate them.

BlockInvest solution would indeed thank to its standardization and the immutability of their ledger, turn this Investment typology Transparent and Real time updated; aiming to root out any possible managerial misleading behavior in reporting the financial health of the position. (...\*)

- **Fractionable Ownership**, this technology would enable the possibility to own even a decimal part of the NPL position giving to the Investor the power to arbitrarily set a sum to invest in the position. Giving him or her the possibility to diversify by picking different positions in any desirable composition, according to his or her own Investment Strategy and Risk propensity.

Instead of Investing in financial products which collect a multitude of different deteriorated positions, of which is merely impossible for the retail Investor to grasp information of each single one financial health state and so the risk behind them.

- **Entry Barriers**, to access any NPL's Investment Fund nowadays you must stick with predetermined thresholds. Thresholds that typically are not lower than 10.000€ in the Italian scenario and so could exclude a multitude of retail Investors that are potentially interested in investing in this sector.
- **Exit Barriers**, even exit barriers are discouraging for small investors. Since typically investing in this typology of Funds requires that the capital must be locked up for a long period (at least 2 or 3 years) having severe fines in case of premature disinvestment or struggling in finding someone who would buy it in a private transaction. On the contrary creating a secondary Market would be easier to match supply and offer for this financial instrument, drastically leading to an increase of Liquidity on this Market. (...\*)

### 3.2.3. Time Cost Transparency

Today's NPL's buying and selling process is time consuming and full of inefficiencies, starting from the onboarding phase of potential investors on the platform where the Bank put at their disposal a more or less exhaustive data tape from which it is possible to evaluate the necessary information to elaborate an offer from the buyer side.

BlockInvest through its platform, it offers a **KYC** fast service (Know Your Customer, compulsory procedure in EU, specifically required in MIFID II, to avoid money laundering and terrorism fight). Thanks to which the Bank has an immediate response about the financial integrity of the potential customer, without losing time in comply with this regulation by its own or paying an extra cost addressing the service to a third party.

Potential **sunk costs** represent a strong deterrent for funds that wants to engage in these deals, as a matter of fact to date since there is not a unique standard to represent these credits, the valuation of a new credit it is most of the time an "ex-novo" valuation. Such assessment embeds an import organizational effort, which is not paid back in the case in which the NPL is not awarded. Many roles of the Organization are involved in the evaluation phase: Analysts, Lawyers, Project Managers, Engineers and so on and so forth. Instead in case this analysis is to be addressed by an external servicer it would be in any case a high consultancy cost.

The presence of a **standard** would therefore help to reduce noticeably these sunk costs and would push the investor to participate to more negotiations, providing them more time to evaluate new positions. Bringing in this way a global increase of potential buyers for each NPL deal.

A further problem which emerges from the absence of a Standard it is the **fragmented information flows**, it frequently leads to a further organizational effort from potential buyer side in reconciliating such information, as well as potential efforts and so poor evaluation based on wrong information. (GIGO Garbage In Garbage Out effect)

### 3.3. BlockInvest Case Studies

#### Alternative Financing for UTPs.

As referred into the literature review, UTPs (Unlikely to Pay Exposures) are a hot issue today especially in the light of Covid-19. The challenge for our National and European regulators is to ensure that Banks NPL's conversion rate will be as much low as possible to not excessively damage banking system lending capacity to let the real economy reboots effectively.

*“There is a strong element of social responsibility in the activity of taking the company back “on-track” from a difficult moment. In this phase, the most critical and exposed categories are the smallest companies, with higher percentages of decay into Bad loan status compared to large corporates. **The Italian NPL Market, The Calm before the Storm, PWC December 2020**”*

BlockInvest with its platform would be an effective tool in supporting UTP's financing, that otherwise would be costly and complex to be managed. With this technological solution it would be possible to gather external fresh financing without the disposal of exposures, that otherwise Banks would have to incur; disposal that would happen through Securitization with the time, costs, and loss of profitability of the case.

A significant example of this **alternative financing** application could be the case of a Construction Company that before Covid-19 was running its operations in a financially smooth manner, but then was impacted by it plummeting in financial distress and so being forced to stop its building Operations for a lack of Liquidity.

BlockInvest solution could easily match this UTP, that has high economic potential and relatively low risk, since the operation per se was in good financial health, with Short Term Investors having a low risk propension offering them an interesting reward risk premium given the cut of costs and time to run this financing compared to traditional Securitization.

Bringing liquidity from Italian accounts holders, which historically and especially in this emergency time are holding an excess of it, to the real economy it would be tremendously impacting for our Economy and Society. Being not just financial speculation, but a way to make sustainable profit by investing in the Italian social fabric.

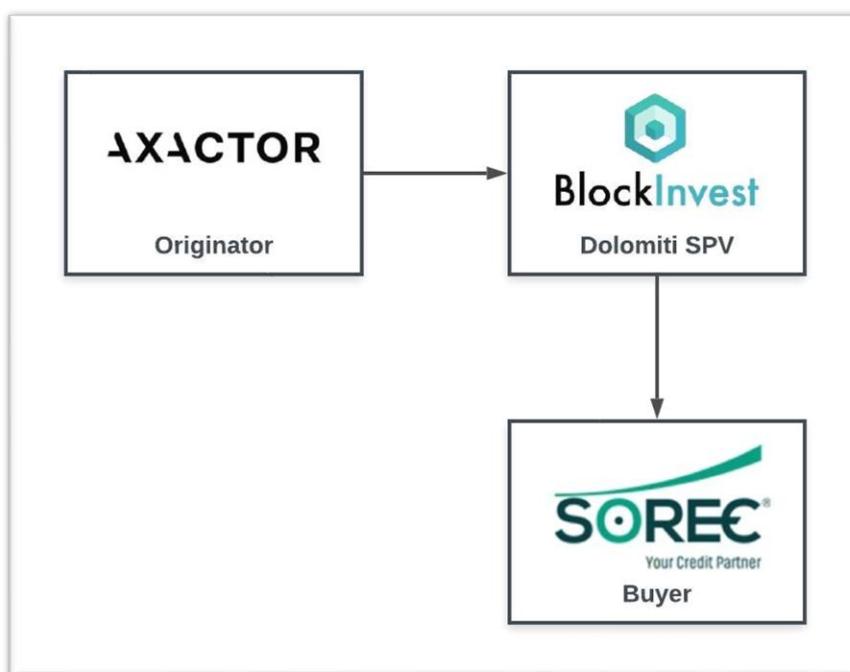
Moreover, there is the entire “Chirograph” (unsecured) Loan World, which is little exploited, but it has an high potential, as it was the case with “Operazione Barolo”.

## Barolo's Transaction, UTP's Portfolio Tokenization Case through BlockInvest

In January 2021, BlockInvets closed its first Securitization transaction of an unsecured UTP's position portfolio, by applying indeed for the first time in the Italian scene this kind of Tokenization through its Blockchain.

The Portfolio was originated by AXACTOR CAPITAL ITALY Srl by combining 1.500 unsecured positions (chirograph) for a total GBV (Global Book Value) of 12.000.000€ and traded without recourse possibility to SOREC Srl.

The Portfolio was Securitized under the SPV (Special Purpose Vehicle) "Società Dolomiti" and with its trade SOREC became Junior Note Holder and Special Servicer.



Thanks to the Securitization on BlockInvest platform, the process was totally digitalized enabling to reach complete transparency and a considerable increase of the transaction's efficiency.

*"The innovative solution, based on Blockchain Technology, will open to a new phase of illiquid assets financing through the creation of innovative financial instruments, tradable in absolute security at a global level"* reported Lorenzo Rigatti Co-Founder & CEO BlockInvest

## Proof of Concept with Credit Agricole

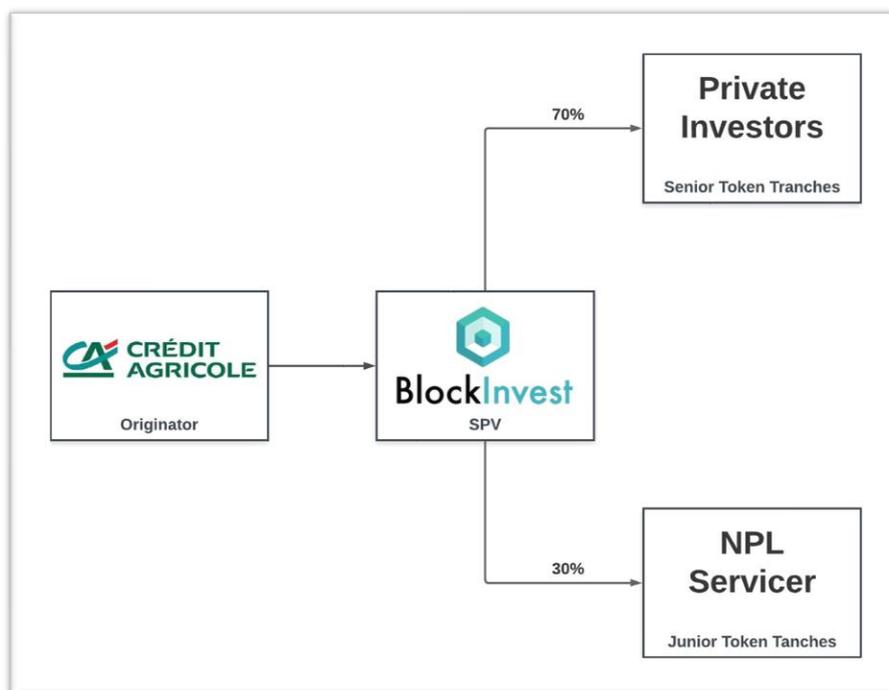
In March of 2021 BlockInvest in Partnership with Credit Agricole, the well-known French Financial Institution, made a proof of concept to stress the usage of NPL Securitization thorough BlockInvest solution and its impact for the creation of a Secondary Market.

This experiment involved the tokenization of a 500.000.000€ NPL portfolio, with authentic documentation (using “dummy” positions, but with all the characteristics of real ones) that was secondly transferred into an SPV (Special Purpose vehicle).

The Securitization vehicle was set up to issue tokens (bond equivalent) with a 6/7% yield for private accredited investors, in comparison to the average 15/18% yield generally asked in these negotiations by buyers “the usual suspects” of a highly concentrated market. (Given the inefficiencies of the Market that have already been underlined as well as the remedies offered by BlockInvest to face them)

To correctly incentivize players, tokens distribution was thought to be divided into two groups of investors (in two distinguished tranches):

- 70% of Senior Tokens for Accredited Investors (Senior Tranches)
- 30% of Junior Tokens for the Servicer (Junior Tranches)



In this way the Servicer, that must be designated from the Financial Institution which originates the Securitization, has an effective incentive to manage the portfolio properly and actively. Since it is tied up for the 30% to it and it has a secondary debt priority in comparison to the Senior Investors. (Moreover, today we have many more Servicers specialized in managing NPLs compared to the past, so it would be easier to find a Servicer, that could engage such investment.)

In this way Senior holders are safeguarded from potential Moral Hazard of the Servicer, being it a powerful tool to align investors and managerial objectives.

Applying the hypothesis to place Senior Tranches to 100 private accredited Investors, potentially even international ones, as long as they are accredited. This must be the case, due to compliancy with the current Italian legislation to access financial products, namely MIFID 2; unfortunately, today retail investors could not access BlockInvest platform and directly participates in these negotiations, they still need to go through a compliant financial intermediary.

The placement resulted extremely efficient, having transferred these tokens in less than 15 minutes with a cost in terms of Ethereum gas fee of approximately 200\$ (cost that is dependent on Ethereum's congestion, but that would not have a crucial impact on the economical convenience of the process). Cost to which in real application must be added notary fees (the transfer agent), that are directly proportional to the price of the trade, generally in a range of 1 and 3%. (Cost that it is unavoidable today, due to compliancy in property transfer, no matter any technological innovation)

In addition to the process efficiency and effectiveness per se, it clearly emerged that the game changer provided by BlockInvest is the opportunity to open to new Markets after the primary issue.

Such token, given the standardization is much more liquid than traditional NPL notes; as a matter of fact, to accurately assess traditional notes, investors must know and trust the Servicer, given that serious Information Asymmetries are implied within such financial instruments. Reporting activity frequency is incredibly low, generally 6 months to receive updates on traditional notes. With BlockInvest one Investor could control real time all the specific documentation underlying the token and to monitor real time recovery curve that the Servicer is forced to update.

## 4. Conclusions

Undoubtedly and unfortunately, in the next few years we will be witnessed to a trend inversion regarding NPL's disposal in the European and in particularly in the Italian banking system; more NPLs will be generated compared to the one that will be disposed. Shifting from the tough reduction engaged from 2015 on, to the next surge due to Covid-19 pandemic; of which to really grasp the magnitude we will have to monitor these four crucial factors:

- Supervisory Capital Controls. Controls and patrimonial constraints will reasonably intensify again, returning to pre pandemic levels.
- End of the temporary Moratorium on Loans for Families and Companies hit by the lockdown's effects.
- The unlock of job dismissals and the consequential increase in layoffs.
- Another possible Lockdown in Autumn and Winter; without the adequate financial aid for Families and Companies most in need.

Of course, we look forward and I look forward to witnessing this surge as less impacting as possible; in this light, investments, and innovation to improve **public administration and court proceedings' efficiency** would be crucial for this Market.

- **Public Administration Digitalization**

Recalling the direct relationship existing among the length in enforcing contracts by Courts and the consequential discount that bank must apply to dispose NPLs; given that a higher time in solving legal disputes would lead to a higher time in collect collaterals and finally to a higher time discount factor in collecting inflows arising from such guarantees. In this respect two qualitative scenarios are envisioned:

- **Pessimistic scenario**

*(No significant improvement in the public administration workflow)*

Enforcing time in Italian Courts to process these NPLs will remain the same or worse; it would increase, given the foreseen soaring of these credits and subsequent Court's congestion. This would be due to ineffective legislator measures or not timely enough to prevent the next NPL's surge. If it will happen the urge for Innovative solutions to tackle NPL's disposal for Banks would be extreme, leaving in this way huge room for BlockInvest solution; in turn enabling the creation of the long-awaited secondary Market. (Given the volume increase due to Covid and the intrinsic slowness of our Courts)

At the expenses of Banks, which would register significant losses in their income statements and in ultimate analysis also on the shoulders of Italian taxpayers; given that most of the Securitizations would reasonably take place recurring to the GACS (*"Garanzia sulla cartolarizzazione delle Sofferenze"*) mechanism, in which public funds are exploited.

- **Optimistic scenario**

***(Significant Improvement of Public Administration efficiency, enabled by Digital innovation)***

To boost public administration's efficiency, Blockchain solutions would be tremendously impacting in managing information and accelerating processes. It would be a key tool in optimizing information flows among Servicers in charge of managing NPLs and the public administrations (Courts, local authorities, regional ones and so on so forth). Facilitating the exchange of information and its accuracy and reliability.

To date, due to the pandemic, in our Country clearly emerged the need to digitalize the public administration and, in this scenario, Blockchain does perfectly suit this need.

*"With the advent of the pandemic, as much sudden as unexpected, in our Country digitalization processes did necessarily accelerated, it is indeed desirable that as soon as possible benefits and opportunities put in place by Blockchain usage also in PA, they will deeply mark a one-time revolution for the everyday life of the single user as for all the community."* Stated by William Nonnis Full stack & blockchain, developer for the Ministry of Defense, on the 12 October 2020 in the article "Blockchain application in the PA area" on Blockchain4Innovation blog.

Just as this need emerged in our Country, it is also observable a spread cultural backward regarding digitalization and Blockchain Technology in the Italian scenario and specifically in the public sector. As it can be grasped from the following lines of the above-mentioned article:

*"Unfortunately, however, traveling across Italy for the divulgation and training at technical level of new technologies (mainly Blockchain permissionless), I figured out how culturally backward is the Country to implement, absorb and exploit consciously all the innovative tools in the IT field available to the user. The lack of an accurate information and digital literacy, both horizontal and detailed, in the vast majority of citizens (including senior citizens, which could not be cut off from a continuously transforming reality) it confines Italy in the last positions in Europe based on the DESI index (Digital Economy and Society Index), which evaluates the digitalization state of the art on the basis of five indicators."*

Although it clearly emerged this need to integrate Blockchain solutions within public administration processes and information flows, BlockInvest it is still too small to actively tackle this challenging public innovation. Being BlockInvest a startup in its early stages, it struggles enough in establishing relationships with Banks and Financial Institutions; today it is not ready to deal with the Public Administration. As it clearly emerged during the interview with Rigatti, BlockInvest's founder:

*"Being still in a startup phase, establishing relationships with Banks it is quite challenging; we are not ready yet to do it with Public Administration. It is a long and complex process, one should interface with it, when shoulders are a bit stronger. Especially because on the other side there is no particular awareness and will"*

BlockInvest would eventually enter in this field when the Company itself would be more consolidated and when on the other side there will be a concrete political will to apply Blockchain solutions within PA. Despite national panels took place, they did not provide any tangible results, we look forward with confidence to see progresses in the future. Hoping that soon we could take a leaf out of virtuous Countries as Estonia as long as regard Blockchain Solutions in the Public Administration (as it is reported in the literature review).

### **Ex-ante NPL's Tokenization**

#### ***(The advantage to early tokenize financial positions)***

BlockInvest could have a fundamental role in preventing financial deterioration and not only a remedy to dispose those positions once the only way to recovery them is to enforce Loans' guarantees.

The ideal solution would be the one to tokenize all the Loans hold by the Financial Institution; to effectively monitor them and eventually grasp "early deterioration signals" to have the opportunity to effectively tackle them before they turn into NPLs. (As it emerged from the above mentioned Indian Paper: "*Smarter banking: Blockchain technology in the Indian banking*")

Even though it would take an important organizational effort at the beginning, it would then lead to enormous benefits in the whole lifecycle of the Loan; being able to effectively monitor each position in real time, knowing its authentic financial health without cumbersome reconciliation efforts from heterogenous information systems.

### **Comparison with Blinks, Prelios' Securitization Platform**

#### ***(A Brief comparison with its "centralized" competitor)***

Despite BlockInvest is today the only viable solution to tokenize these financial exposures, it is not the only Platform interested in providing a standard for this niche industry and a simplification of the Securitization process.

Prelios (that is by far the leader among Credit Servicers, it has conducted more than 50% GACS's Securitizations), within its subsidiary Prelios Innovation, launched its own Platform, namely Blinks, for the negotiation of deteriorated credits.

As a matter of fact, this Platform was taken as an example by the European Consultation started on the 16 of June 2021 regarding the improvement in transparency and efficiency for the NPL's secondary Market. (Through the establishment of a Standard data tape for the Securitization, fundamental for the Secondary Market, but firstly for the Primary one).

Prelios is currently participating in the European advisory panel, to provide the industry of such standard, strengthened by its longstanding experience in managing NPLs in Italy. Experience from which they will benefit in terms of Marketing, being able to exploit the network they have been created in these years, both in terms of Sellers and Buyers.

Blinks on the contrary of BlockInvest is exploiting a centralized information system to run the Platform, failing in this way to grant the same interoperability, transparency and accuracy ensured by Blockchain.

The importance of a decentralized data tape relies in the fact that it could eventually switch from one Servicer to the other, on the contrary some conflict of interests may emerge in the information ownership and management.

In conclusion to this analysis, it is quite clear how in the next years we will see a surge of deteriorated credits in banking assets and in the European Community; it is quite spread the awareness that it is, and it will be a crucial issue to tackle; to restore strength to a financial system which will get out damaged by the pandemic.

Once the NPL portfolio's standard would be established, the application of BlockInvets solution could be a powerful tool to give life to financial deteriorated positions, by optimizing on one side the current Securitization processes and enabling alternative financial methods of such positions on the other side.

Resulting in a convenient establishment and management of a secondary market to impact on the social and economic fabric directly and positively, paving at the same time to a new audience of passive investors this asset class featured by appealing risk reward premium.

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