

A Tale of Two Civilizations

In the Era of Facebook and Blockchain

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Abstract: Five billion people in the world do not have the kind of ledgers that provide the documented information that allows them to transfer, partition and aggregate assets and talents in such a way that they can be scaled up, secure investment, guarantee credit, certify reputation and capture abstract surplus value. The difficulty that most people have in making combinations is a major cause of global inequality and unnecessary poverty.

1. Introduction

Human communities transformed themselves into civilizations when they titled and recorded the indefinite property rights they respected in rule-bound ledgers, thus providing entrepreneurs the knowledge and means to securely combine rights to inconsequential single assets into more valuable wholes.

Over time the communities that gave special attention to ledgers increased their knowledge incrementally, as the process of collecting, categorizing, validating and recording obliged them to understand which rights were important for their welfare and worth remembering. They are the people who were able to combine talents and assets so as to create surplus value *ex-nihilo*.

The result today is two unequal civilizations:

The **combining civilization** has two billion members whose ledgers connect them to law that not only awards them the original right to own assets but also some twenty additional rights to join them into more complex and valuable combinations—from cars and computers to sophisticated infrastructure projects.

These additional rights include those of pledging title to assets against investment and credit, crossing sovereign borders to scale up their markets and appropriating the surplus value generated by combinations.

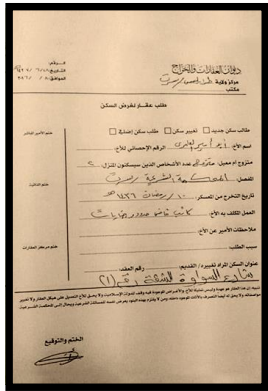
The other is the **lagging civilization** of five billion members whose ledgers are so disconnected from the laws that award and enforce the additional rights that they cannot easily combine, leverage or enforce whatever rights they are entitled to beyond narrow sovereign boundaries and thus cannot scale up to generate surplus value.

The consequences of most of the world not having the property rights needed to combine account to a great extent for terrorism, conflicts over the environment, migration, revolution and the lack of public services.

2. Problems

Peru and other countries in the developing world encounter several problems.

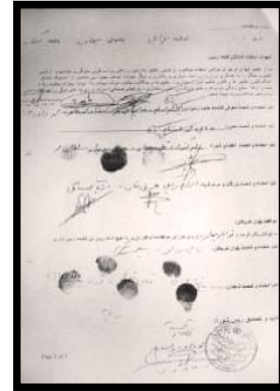
Problem 1. Racketeers and Terrorist Groups



ISIS Title in Sirte, Iraq



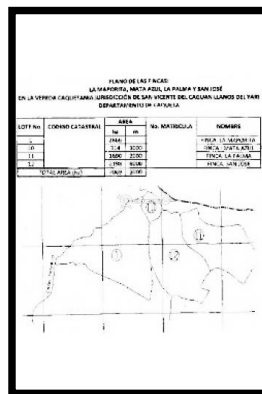
ISIS rent control in Anbar province, Iraq



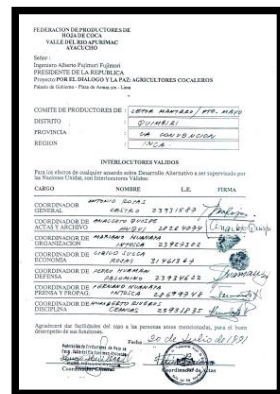
Al-Qaeda Title, Afghanistan



Taliban Title, Afghanistan



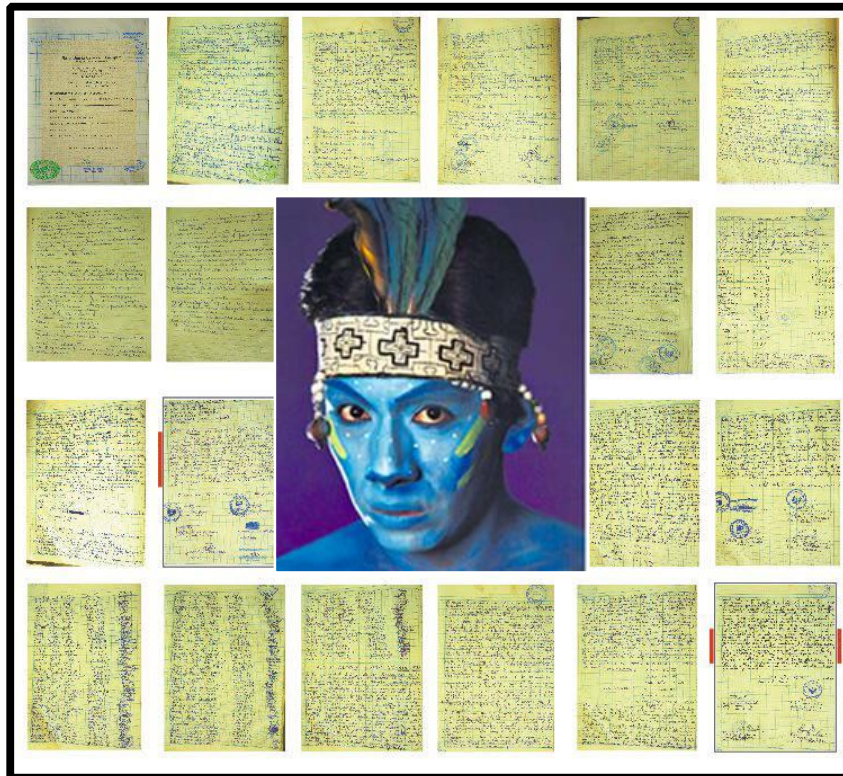
FARC Title, Colombia



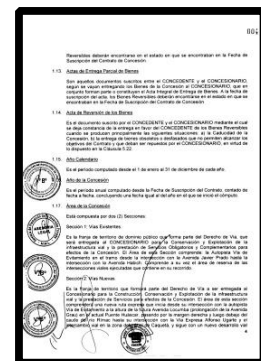
Shining Path Title, Peru

The most frustrated among the five billion people without property rights and their economic benefits have tacitly concluded, rightly, wrongly, and in a state of learned helplessness, that westerners will continue to appropriate their resources and probably at their expense. Their response has been to surrender the protection of their property to terrorist or criminal groups. Why? Because enforcing sovereign boundaries and property rights recorded in disconnected ledgers is the business of terrorist groups everywhere, whether Al Qaeda and ISIS in Central Asia, and the MENA region or the Shining Path and FARC in Latin America. In fact, the strategy of offering to protect local property rights is a tried and true strategy used by insurgency groups to gain the respect, shelter, taxes and recruits from alienated populations, which will in turn aid them in conquering the sovereign right to govern the very territory these people inhabit.

Problem 2. Environmental Wars



Indigenous titles in Shambuyaku Amazon oil fields



Extractive industry concessions

Poor populations living in territories rich with natural resources too often blame all their woes resulting from environmental damage on extractive industries blessed by government concessions. Fearing their inability to match the political and legal power of large companies, the local activists proceed to challenge the official legal system by issuing their own titles. Legal conflicts—and illegal violence—ensue.

Ideally, of course, there should only be one standard title and ledger system capable of identifying those who hold sovereign and property rights over damaged territory, which also can single out and reward those who spot the damage.

Problem 3. Massive Migration

People who feel dispossessed and with little of value to lose are more willing to emigrate to combining civilizations—fortified by the hope that in their new country the rule of law will award legal rights to whatever property their ambition, talent and hard work helps them obtain.



Problem 4. Revolutions



People who are arbitrarily—and violently dispossessed—can take to the streets and start revolutions that topple governments; they will even commit suicide in protest. This might strike most Westerners as an extreme response, but it was exactly what hundreds of people in the Middle East and North Africa (MENA) did in 2010–2011, lighting themselves on fire to protest against the “expropriation” of their assets, sparking “the Arab Spring” revolutions throughout the MENA region, unleashing civil war, hatreds and terrorism, which have forced millions more to migrate to the West.

Problem 5. Lack of Public Services



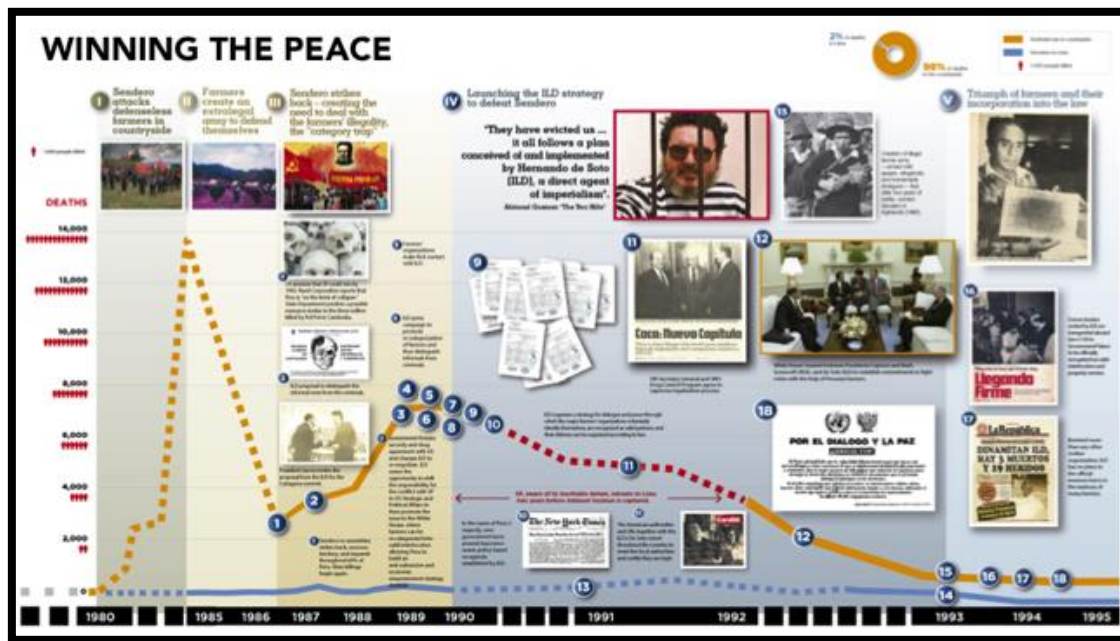
Not having rights to combine and pledge assets means that many members of the lagging civilization cannot use their property documents to act as credentials for receiving public services. For example, a house with full rights can function not only as a shelter but can also lead a parallel life as a locus for identifying residents for commercial, judicial, and civic purposes; and as a liable terminal for receiving public utility services, such as energy, water, sewage, telephone, or cable services.

3. Does giving property rights help end violence?

In my limited experience the reply is yes, provided it is a bottom up process, i.e., that rights are given in terms of the social contract which underpins the disconnected ledgers. The authorities who run the local ledgers have to be engaged directly with their constituencies addressed through crowd sourcing media.

Two examples follow.

Example 1. Rights awarded during terrorist conflicts



In Peru in the late eighties, my colleagues and I recognized rights in areas where war against terrorism was ongoing in collaboration with farmer ledger organizations with the government and the support of the United Nations. Success was acknowledged by the press, the farmer ledger organizations, government authorities and the terrorist leader himself who wrote in his essay *On the Two Hills* (1991):

It all follows a plan that, through international treaties and national reforms (....) aims against the People's War and seeks to annihilate it (...) It was designed and implemented by Hernando de Soto, a direct agent of Imperialism.



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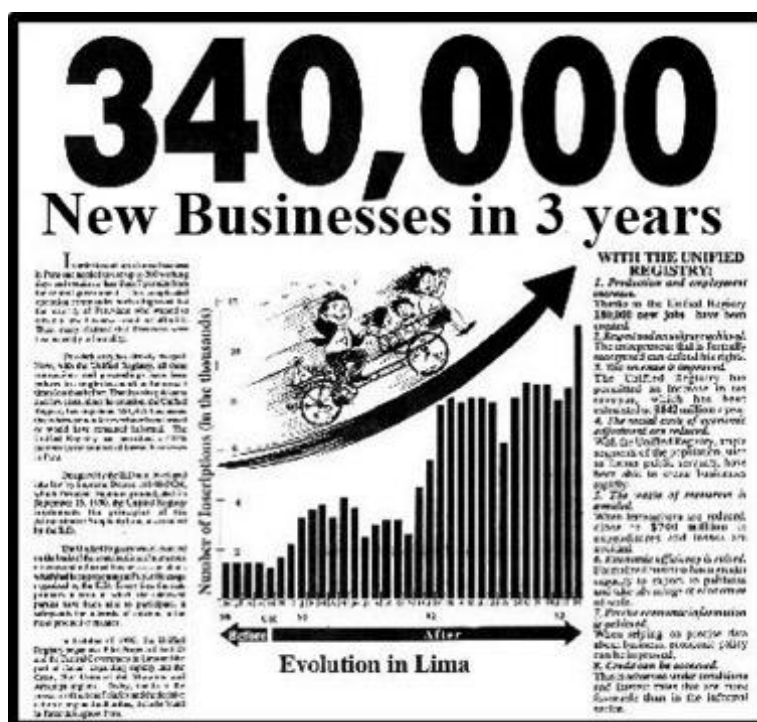


ALTO HUALLAGA



VRAEM

Example 2: Rights awarded to small enterprises



4. Methods Learned

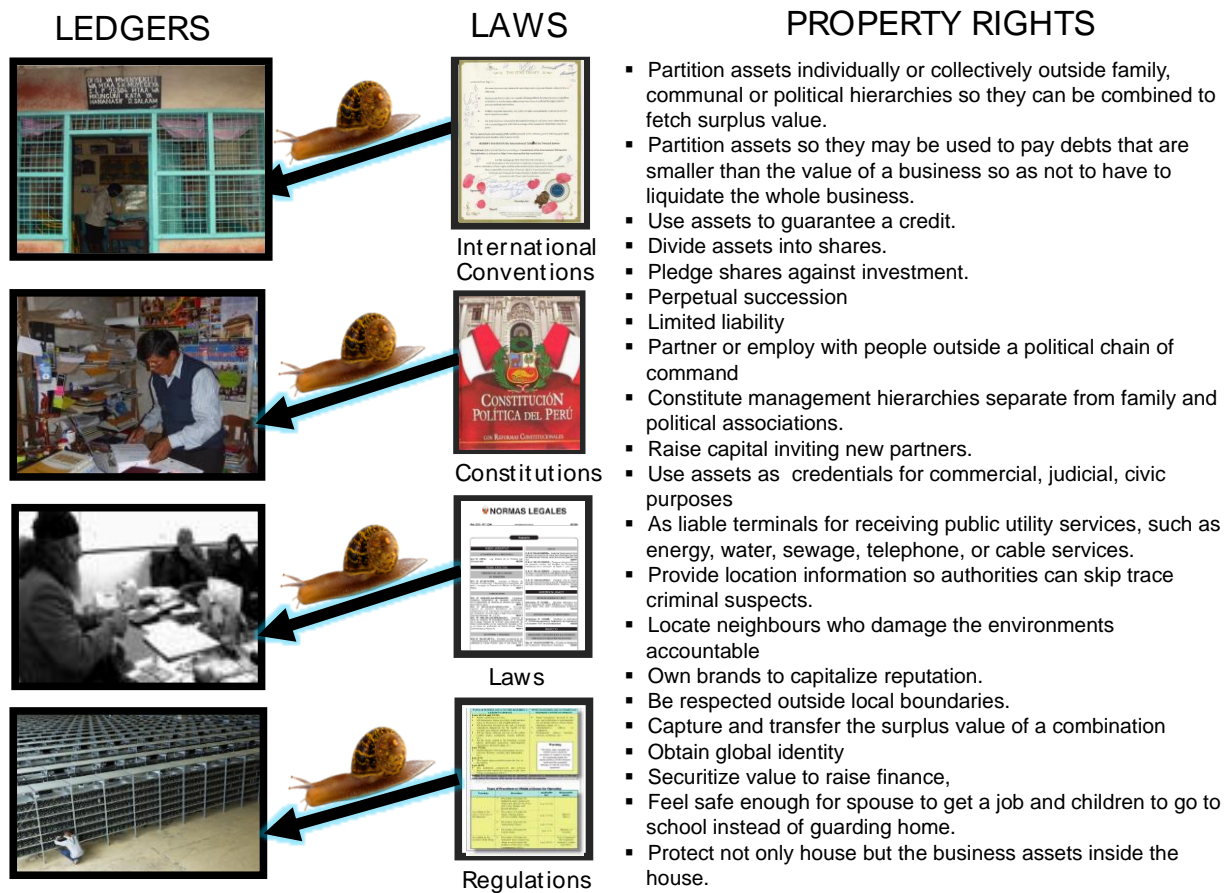
In the uphill process of figuring out how to give good property rights to those that don't have them we learnt through trial and error how to think and act in a world split into two civilizations.

I am not saying that these methods are applicable in all circumstances nor that they should meet everyone's approval but they are the ones that worked for us.

Method 1: Close your books and open your eyes

Don't rely on existing conceptual frameworks that explain existing legal property rights law to organize your thoughts: it is clear that two thirds of the world has not found a way of fitting in it. Instead, build a conceptual framework that helps you angle, sequence and formulate questions contrived to make those who are part of a lagging civilization voluntarily provide you with the direct knowledge that is needed to address and solve that problem as well as a different perspective on what the books say.

Method 2: Measure the time it takes for property legislation to reach the people it aims to help



Any good jurist in the lagging civilization is likely to confirm that legally all citizens, poor as well as rich, have the same property rights. It is encoded worldwide, starting with the Universal Declaration of Human Rights, numerous international conventions and ending with the constitutions and relevant mainstream laws of nearly all countries.

The history of the 18th and 19th century Industrial Revolutions in the US and Europe demonstrates that it can take a century or two for property rights awarded at the commanding heights of law to navigate across what I have come to call the “legal lag”, a turbulent stream of outdated laws and unnecessarily complex administrative procedures before a right to property is spelled out in a manner that allows it to incorporate disconnected ledgers into the legal system.

Same thing today: Much of the legislation that enables the widespread exercise of property rights that was initiated in the last quarter of a century or so, after the fall of communism, has not found its way into the lagging civilization.

Method 3: Do not restrict the quest for knowledge about how to use property rights as a tool for problem solving to the field of property law. Many crucial property rights are not contained in property law. If your mission is to help boost the poor out of poverty by giving them the legal tools to combine their assets into more valuable wholes, it is important to understand that property rights are about more than property law.

In my experience, much of the property rights needed to combine are not in property law. Others disagree, but if I win the debate, it would mean that one of the reasons that titling programs are failing is because they don't award the property rights needed to create combined assets, create surplus value and solve violent problems.

Not generally available in the lagging civilization for making combinations possible are the crucial rights to:

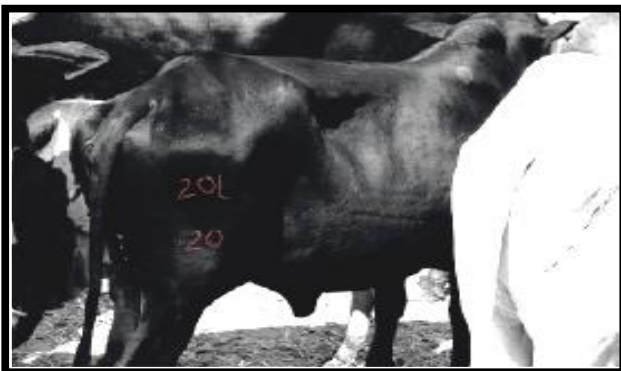
1. Partition assets individually or collectively outside family, communal or political hierarchies so they can be combined to fetch surplus value.
2. Partition assets so they may be used to pay debts that are smaller than the value of a business so as not to have to liquidate the whole business.
3. Use assets to guarantee a credit.
4. Divide assets into shares.
5. Pledge shares against investment.
6. Guarantee perpetual succession.
7. Guarantee limited liability.
8. Partner or employ with people outside a political chain of command.
9. Constitute management hierarchies separate from family and political associations.
10. Raise capital inviting new partners.
11. Use assets as credentials for commercial, judicial and civic purposes.
12. Use a location as liable terminals for receiving public utility services, such as energy, water, sewage, telephone, or cable services.
13. Provide location information so authorities can skip trace criminal suspects.
14. Locate neighbors who damage the environment and make them accountable.
15. Own brands to capitalize reputation.
16. Be respected outside local boundaries.
17. Capture and transfer the surplus value of a combination.
18. Obtain global identity.
19. Securitize value to raise finance.
20. Feel safe enough for spouse to get a job and children to go to school instead of guarding their home.
21. Protect not only the house but also the business assets inside the house in case of eminent domain.

Method 4: Do not start by examining the legal codes ruling property rights. Though codes contain a good deal of the information needed, you can only detect which codes—and which part of the codes—are relevant to the quest using indicators collected from records in the lagging civilization.

The crucial knowledge about what rights are missing and which are the norms that cause the lags will be hard to extract from wading through the legal texts of the combining civilization. In Peru, for example, the central government produces roughly 106 laws and regulations per day, which adds up to 30,000 per year—more than half a million rules since communism collapsed, and Peru began to modernize. Learning anything from the laws on the books might even be more difficult than the proverbial search for a needle in a haystack.

Method 5: Don't expect obtaining the necessary knowledge by examining the titles that represent rights in the lagging civilization.

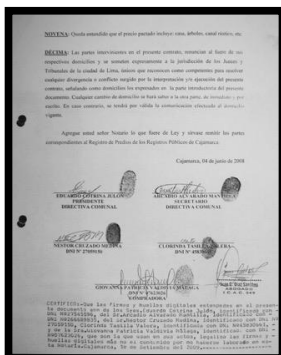
Unless your passion is anthropology, semiotics or ontology, spending time examining the titles that represent claims to property in the lagging civilization will probably generate minor evidence of real rights and lags. Titles are discrete, dispersed and not always written on paper.



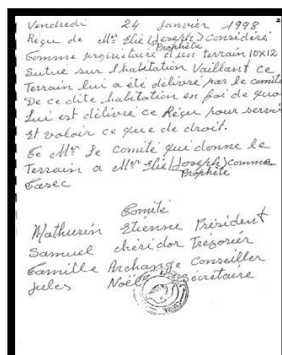
Titles branded on cows, Tanzania



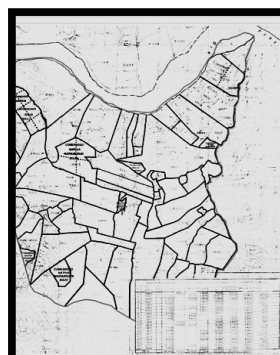
Titles painted on blackboards on buildings in the City of the Dead, Cairo, Egypt



Title of mining subsoil, Peru



Title Haiti



Title that includes map of individual parcels in Mariankiari Bajo, Peruvian Amazon region.



Title that includes location of asset in a map, Afghanistan.

Method 6: Focus on the ledgers of the lagging civilization, the stewards who administer them and those who enforce the rules that bind them all. That's where the knowledge trail begins.

Ledgers are more than a laundry list of what people own; they are, in fact, the initial point of entry into knowledge. It stands to reason: Ledgers are the result of a memory-based process and what we know is only what we can remember.

Generally, ledgers are the most reliable source of knowledge because, in one way or another, they store the documents, the evidence and the testimonials not only of what one person thinks is true but what everyone believes is right. They are the written reflection of the “social contract” between members of a society as to how they relate to each other regarding the control, transfer and enforcement of their property rights. In many cases, the social contract also established what most people believe their sovereign rights to be, since they provide how they can be protected from the wealth and power of outsiders.

Two important facts about today's disconnected ledgers:

1. It is at the ledger level that rights are established, complied with and enforced. That is where the reputations of their constituencies are made. Therefore, though most of the people in a lagging civilization would love to have combining rights, they will reject any entitlement which weakens the local consensus that defends their existing rights unless it is demonstrated that the obstacles causing the legal lag have been removed.
2. The knowledge required to identify the legal gaps that impede people from accessing the 21 combining rights that worldwide legislation establishes is also found at the ledger level.

Method 7: To address the disconnected ledgers they have to be located, their authorities identified and then engaged directly.



One of 10,000 Mwenyekiti ledgers, Tanzania.



Ledger in Congo, Peru.



Ledgers in Securities and Exchange Commission, US.



Ledgers contained in international treaties, Brussels.



ISIS ledger in Raqqa City, Syria.



Shining Path ledger in Peru.

Though the above images make disconnected ledgers look like an anarchic reality where things are difficult to find, these ledgers all fall neatly in 11 categories just about everywhere in the world and if you follow our protocols they are easy to locate.

Six types of ledgers managed by legitimate grassroots or autonomous organizations— independently from the central government:

- Urban lodging, industrial and street settlements;
- Rural collectives;
- Extractive industry settlements;
- Infrastructure project settlements;
- Areas receiving small business financial services;
- Areas categorized by Government as smuggling and drug trafficking territory.

Five types of ledgers created on the basis of international agreements:

- International Treaties including Free Trade Agreements and Bilateral Investment Treaties.
- Ledgers resulting from international contract adherence.
- Ledgers drawn up by law firms for principals to sell securities.
- Ledgers resulting from the application of international organization guidelines.
- Ledgers resulting from the application of *Ius Cogens*.

Method 8: Invite the ledger administrators to a meeting or put an ad in the paper and tell them that you want to talk about the 21 property rights they do not have. In my experience, if you invite them, they will come—4,000 to 15,000 people at a time. And then, let the knowledge gathering begin.



Come and get 8 rights.



Merchants in Gamarra, Lima.



Farmers and miners in Juliaca.



Get an enforceable title.



Gold diggers in Jicamarca.



Citrus farmers in Huando.

Method 9: The overwhelming majority of people in the lagging civilization want to catch up and combine. The problem is that the process of awarding them rights is dreadfully slow. In the course of the last two years we have found out that you can automatize the communication process by using social media to reach millions instead of thousands.

In the remote rural areas of Peru some still armed small mostly farming entrepreneurs appealed to me to help them improve their situation and the property rights they received two decades ago. I agreed to meet with them—and they showed up in force: 2,000, armed with guns and cell phones.

When two months later to continue our meetings I sent out a request via Facebook and amazingly I reached more than 2.4 million people.

OUR WAY – 2,000 PEOPLE AT A TIME



16 DECEMBER 2016

FACEBOOK - 2'400,000 PEOPLE AT A TIME



25 JANUARY 2017

The same thing happened after I physically met 4,000 small mining entrepreneurs and then continued the meeting via Facebook and reached more than two million people.

OUR WAY- 4,000 PEOPLE AT A TIME



20 NOVEMBER 2014

FACEBOOK- 2'000,000 PEOPLE AT A TIME



10 FEBRUARY 2017

Method 10. Devising and automated system that can substitute rifles with titles (so to speak) rapidly and efficiently.

About two years ago I reached the painful conclusion that the methods I learned were not quick enough. Those CEOs, Heads of State, or humanists who are interested in connecting the two civilizations for business, governance or peacemaking purposes rarely have a mandate long enough for them to wait and get massive results.

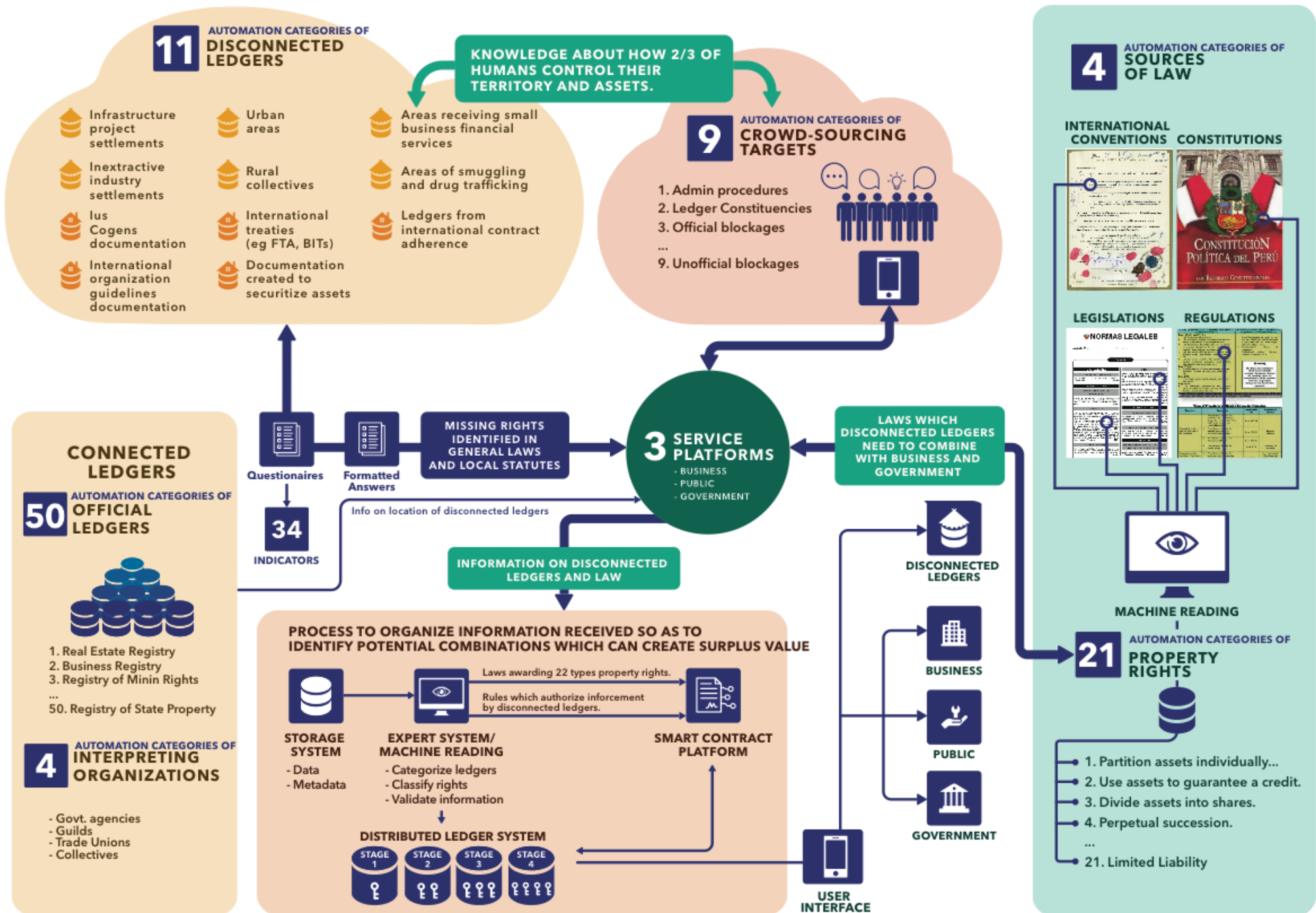
However, a couple of years ago I met friends who convinced me we should explore the venues offered by ITC and try to build a digital system capable of locating disconnected ledgers, identifying their leaders and extracting from them the information needed to short cut the legal lag and, processing the information contained in them, to provide them an identity as well as the tools required to plug into the conventional legal systems.

Thanks to the encouragement of generous friends and the patient enlightening and intellectual coaching of Bill Tai from Silicon Valley, we are now more than a year into designing such a process.

On the basis of our experience, we feel the process can help locate most disconnected ledgers in any country by obtaining on-line information about them through four types of organizations covering fifty economic sectors. Through that pipeline expect to identify most ledger leaders and through them collect, categorize and standardize the basic information about their ledgers and rights so that it can be translated into controlled vocabularies that can be processed by computers.

All that information would then be recorded in a digital registry and then, in a second pass, using form fill-in questionnaires that are guided by 34 indicators, identify what rights are missing and where the obstacles to obtaining them are.

With that information sorted out—and on the basis of machine reading systems guided by other indicators we can identify where the legal rights to combine are hidden within the legal maze—we can then build digital tunnels and bridges to short-cut the legal lag. Even before reforms are made, the information obtained can produce quick results via distributed ledger systems and smart contracts to solve conflicts and connect governments and large businesses to the lagging ledgers within the context of a law that both sides of the divide can trust.



Method 11: Use history to remind those Westerners, who have a hard time believing all of the above, that their ancestors were once there and that change is possible.

To this end I have made an effort to inscribe our strategy into the history of the Industrial Revolution in the West. My suspicion is that a key ingredient to organizing the standard ledger knowledge that entrepreneurs require to make combinations and gauge risks came about more as a result of satisfying their requirements throughout the ongoing Industrial Revolution than through reflection. The basis for this statement is that I was impressed by how little credit was given to all the property knowledge gathering, selecting and standardization that the dramatic process of industrialization brought about.

In my reading of history, the founding fathers of market thinking agreed that the shortcomings of their discipline had a lot to do with not understanding how people come to trust others in order to do business. For many of them, economics did little to explain how businesses marshal the knowledge they need to trust each other, identify creditworthiness, divide labor productively among themselves and make efficient decisions. Karl Marx wondered where one could find the “essential links and relations” that allow humans to know each other and cooperate on a large scale; while Friedrich von Hayek dedicated a whole book to making the case that the human mind does not have the sensory attributes to know economic reality directly and to access the existing knowledge dispersed throughout the world.

Many economists, sociologists and psychologists either assumed the problem away or borrowed from philosophy the logical tools that elucidate collective understanding: Adam Smith’s “invisible hand,” Hayek’s “catallaxy,” Foucault’s “episteme,” Popper’s “world three” and Jung’s “knowledge rhizome” boosted the issue of knowledge into the realm of metaphysics... thus tip toeing around the directed knowledge which ledgers store on the basis of sophisticated and tested criteria and that which comes about by revealing the relationships that make up a consensus.

Yet, stretched over five bumpy generations, it was ledger building that picked up, structured and transmitted much of the ripe knowledge we need to trust each other and make combining decisions. Large scale ledgers arose to prevent the collapse of the industrial and commercial revolution. At that time, the growing force of expanding markets was destroying traditional, small scale forms of production—such as feudalism, patrimonialism and tribalism—and putting many of their people out of work. The result was a huge rift between the social order and the expanding market, as angry and alienated people unable to be quickly integrated into the new economy took to the streets, unsettling and toppling governments.

Enterprise could not pick up the jobless and poor because most forms of reliable economic knowledge were organized on a small scale, too small to allow entrepreneurs and financiers to trust and divide labor on a large scale. So one way or another it was crucial to organize knowledge on a large scale so that all players in every nook and cranny of the West’s

widening markets, in Charles Coquelin's words, "could pick up the thousands of filaments that businesses are creating between themselves, and thereby socialize and recombine production in a mobile fashion...so as to readapt the social intelligence of society."

The result was the invention of large scale ledgers or what I have called "public memory systems" to record and classify—in rule-bound and publicly accessible registries, titles, balance sheets, and statements of account—all the knowledge available relevant to the economic situation of people and the assets they controlled, whether they were intangible (stocks, commercial paper, deeds, contracts, patents, companies and promissory notes), or tangible (land, buildings, boats, machines, animals and books). Knowing who owned and owed what and where and under which circumstances made it possible for investors to infer value and take a risk.

What do ledgers or memory systems have to do with knowledge? Plenty, for two reasons:

The first is that knowledge is essentially a memory-based process, which involves selecting, categorizing and storing the knowledge we need. Knowledge increases incrementally forcing us to understand and validate each additional input obtained so as to decide which one is important to our welfare and worth remembering, how it should be written up and packaged, in what context it should be described and how it should be stored so as to be easily retrieved and combined.

The second reason is that ledgers created facts by aggregating bits of information into larger wholes that are easy to perceive and test for truth. As the British philosopher Bertrand Russell would have put it, the world, out there, is made of minuscule atomic facts that he called "little patches of color," which, when combined, could take the form of a picture... something that is easier for the eye to see and the mind to understand.

Significantly, the definition of "fact" evolved along with public memory systems: 150 years ago, "fact" described an occurrence, a deed; today in business, "fact" means a precise, rule bound, standardized statement that faithfully signifies a particular set of relationships.

Sure, facts are not only created by ledgers and knowledge originates and can be stored in more places than in ledgers. But that's not my point: my point is that complex combinations which require verified and authenticated information are hard to produce without the facts produced by ledgers.

Method 12: Contextualize. The dramas of Oliver Twist, Jean Valjean and Mohamed Bouazizi can only be explained in the context of the times they lived it.

I realize how dangerous it is for a Latin American to seek so much support from the history of the Industrial Revolution in Europe and the US to make my case for property recordation. I know how keen Europeans are about history and that no matter how rational and cold-eyed they might be, familiar historical allusions are likely to ignite deep-rooted emotions. Reading Fernand Braudel on the rise of property you can see that overall he admires the process. Reading Thomas Piketty you can see that everything associated property is a horror story that he links to the hardships of Jean Valjean, as drawn by Victor Hugo in *Les Miserables*, and the suffering of Oliver Twist drawn by Charles Dickens.

But the reader must understand that regardless of the tragedies and glories, the rights and wrongs, of the Industrial Revolution, I'm using Western history to make the case that some of the best inventions in the world do not arise spontaneously from one particular brain (or many brains), but are a response to some dramatic challenge.

Well, those dramatic challenges are now popping up all over the world and because the West is not associating them to property rights issues it is not responding to them correctly.

A case in point is the Arab Spring, sparked in December 2010 by the self-immolation of Mohamed Bouazizi, a Tunisian entrepreneur, protesting the arbitrary expropriation of his merchandise.

Bouazizi's suicide and the news that it was caused by violating what were perceived as being his property rights sent dozens of millions of people into the streets who in a few short months toppled four authoritarian governments. No wonder: I have estimated that more than 200 million people throughout the Middle East and North Africa depend on income from operating businesses and living in territory protected by the vulnerable disconnected ledgers of the lagging civilization.

My researchers located ledgers in different parts of MENA and found that Mohamed Bouazizi's desperate protest wasn't unique. We discovered that at least 63 more MENA entrepreneurs, men and women, in Tunisia and Algeria, Egypt, Morocco, Saudi Arabia, Syria and Yemen, had followed Bouazizi's example within 60 days of his death—the critical period during which governments were toppled.

Of the 64 self-immolators, 37 survived, and over a couple of years we interviewed them on film. They were all entrepreneurs and none of them made a political or religious statement. The principal reason that these self-immolators gave for their acts was “expropriation,” arbitrary seizure of property weakly protected by a disconnected ledger.

A common view of Bouazizi's death is that he killed himself because authorities confiscated one of his fruit carts containing assets worth \$225. Examining the ledgers, we found that it was more than that: they deprived him of the nine property rights listed in the illustration below.



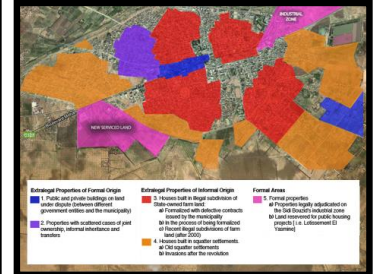
Mohamed Bouazizi after expropriation



What did the press say he lost?



What he actually lost were 9 property rights to:



Ledger authorities in District # 2 of Sidi Bouzid expropriated him.

In the following 60 days 64 self immolators followed and tumbled 4 governments.

60 DAYS 64
EXTRALEGAL BUSINESS PEOPLE
IGNITED THE ARAB SPRING

DECEMBER 17, 2010 MOHAMED BOUAZIZI FRUIT CARETAKER
DECEMBER 22, 2010 MOHAMED MACHALLA METAL MECHANIC
JANUARY 11, 2011 MOHAM KADALLAN STREET VENDOR
JANUARY 17, 2011 AMR ABDEL HAKIM RESTAURANT OWNER
FEBRUARY 22, 2011 FADOUA LAJOUI REAL ESTATE OWNER
JANUARY 18, 2011 MOHAMMED ALI LATIF BUILDING CONTRACTOR

1. Capture new investment by issuing shares
2. Raise capital by bringing in new partners
3. Raise financing by issuing bills and notes
4. Expand markets beyond family and neighborhood
5. Pool skills and resources by collaborating within an enterprise with non-family members
6. Ensure throughout time the survival of reputation, goodwill, brands, and other such intangible values by legally documenting them
7. Protect personal, family or communal assets by limiting liability
8. Use reputation and property as information and collateral for credit
9. Enforce public and private commitments over the long term

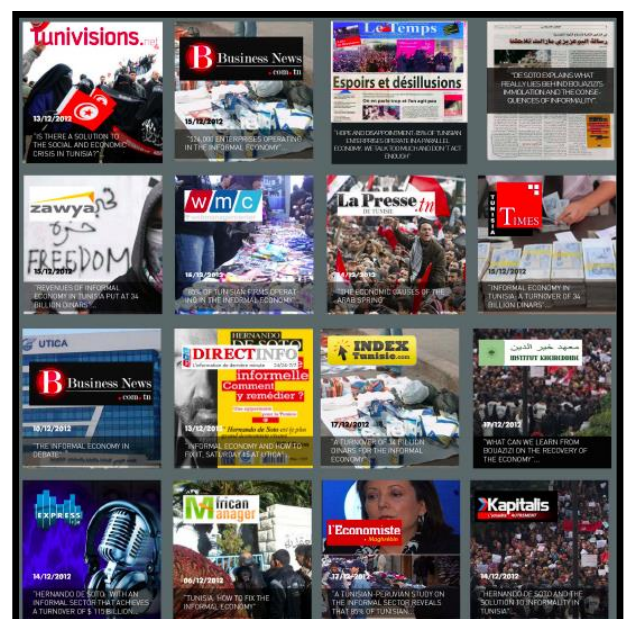
We published our results and the Arab press caught the idea quickly. Nearly 200 newspapers and magazines headlines in MENA. No headlines in the West.



North Africa



International



Middle East

5. By Way of Conclusion

Why was it so difficult to recognize that the Arab Spring—and all the other revolutions in the lagging civilization—are motivated by the desire of millions of ordinary people operating outside the law to protect and combine assets and thus join the Industrial Revolution? One difficulty could be that some Westerners bundle property rights with the notion of privilege and have difficulties in treating them separately. Whatever the case, we are now divided into two distant civilizations, the complex and the simple, which means we are still a long way from becoming a global village.

Another difficulty is that visualizing the institutions that hold together the societies of the lagging civilization is not easy. The institutions are housed in thousands of disconnected ledgers and hidden in millions of pieces of legislation, statutes and regulations. I think that editing that information so that it fits in digital screens where it can be aggregated and linked to the current affairs that concern us, it will be visualized.

Reading back what I have just written, I believe more and more that rule bound property ledgers are an extraordinary creation of mankind. Unlike tigers and wolves, who bare their teeth to protect their territory, humans, physically much weaker animals, have used their minds to create a legal environment where on the basis of consensus materialized in ledgers we can protect our territories with rights instead of fights.

In the process of structuring a legal system to settle claims we have inadvertently created a system that has taken on a life of its own and provides us with what Alexis de Tocqueville believed was the source of all knowledge when he wrote that: *“Knowledge of how to combine is the mother of all other forms of knowledge”*.