Blockchain in Catalonia

July 2018

Technology Snapshot
Blockchain in Catalonia: Technological Snapshot

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1. Definition of Blockchain and its Importance for Industry
Definition of Blockchain

Blockchain is a decentralized distributed database made up of chains of blocks designed to prevent their modification once the data have been published. This is achieved by means of a digital timestamp and by linking each block to the previous one. It makes it possible to carry out financial and non-financial transactions between two parties in a secure, reliable and irreversible manner, without the need for an intermediary or central authority to establish trust between the parties or to verify the transactions.

PAST
Centralized

PRESENT
Decentralized

FUTURE
Distributed - Blockchain

Source: Authors’ own data based on data from Frost & Sullivan, Expansión, CecaBank, 8Wires
Blockchain: How It Works

Blockchain works by means of the following process:

1. Communications between two points travel over a distributed network made up of nodes, which keep a copy of the communications. Every change made to the information sent is reproduced with a timestamp in each of the notes, instantly.

2. Any modification of the content of the communication must be validated by all the nodes using previously agreed algorithms. Once the change has been validated, the information becomes a new block.

3. This block is added to the blockchain permanently and unalterably. The information has reached its destination. Any changes to this information must repeat the entire process and will become a new block, which will be added to the chain.

Source: ACCIÓ based on data from SmartCatalonia
The Importance of Blockchain for Industry

Cross-sectoral: Convergence with other technologies

Control and reliability

Cost reduction

Impact on innovation

Blockchain generates innovation opportunities for companies in different areas: products, processes and business models.

More efficacious processes that make it possible to reduce or eliminate the costs of bureaucracy, the costs of inefficiency due to the existence of intermediaries and long waiting times, and bank charges, which will become a thing of the past thanks to new smart contracts.

In the long term, blockchain will converge with the Internet of Things and will also facilitate the development of new disruptive technologies in the future.

This technology has potential applications in many sectors, including banking and finance, security, e-commerce, the cloud, transparent government, and the development of new business models.

It is a reliable system of databases that guarantees user security, as the data are protected.

The Importance of Blockchain for Industry

Source: ACCIÓ
2. Key Global Dimensions
World’s Leading Companies in Blockchain

Companies Specializing in Blockchain

- Chain
- Ethereum
- r3.
- ShoCard
- Slock.it
- Ethlance
- Coinbase
- Provenance
- LO3 Energy
- CoinDesk
- Colu.
- KrypC

Top Cryptocurrencies, as at June 2017 (World Economic Forum)

- Litecoin
- Monero
- Cash
- Bitcoin
- Ripple
- Bitshares
- IOTA
- Dash
- Ethereum
- Nem
- Ethereum Classic

Other Companies Developing Blockchain Technology

- IBM
- Microsoft
- Thomson Reuters
- Linux
- SWIFT
- JPMorgan Chase
- Accenture
- Google

Current and Expected Data

Size of the Blockchain Market
The global blockchain market is expected to be worth $2.3 billion in 2021, with an annual growth rate of 61.5%.

**Blockchain Market (US$ bn)**
Estimated trend in the value of the global blockchain market to 2021.

<table>
<thead>
<tr>
<th>Year</th>
<th>Value (US$ bn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>0.21</td>
</tr>
<tr>
<td>2021</td>
<td>2.30</td>
</tr>
</tbody>
</table>

Blockchain Facts and Figures

- The biggest wave of adoption is in the Middle East.
- The current rate of development of blockchain is comparable to that of the Internet 20 years ago. Only 0.5% of the global population uses blockchain, whereas 50% or 3.77 billion people use the Internet.
- Around 90% of North American banks are exploring blockchain-based solutions.
- It is estimated that banks would be able to save between $8 and $12 billion a year thanks to blockchain technology.
- Nine out of every ten people think that blockchain will be disruptive for banking and the financial industry.
- One-third of top executives are using or considering adopting blockchain technology.

Source: ACCIÓ based on data from Frost & Sullivan, Forbes.
Main World Regions

North America - World Leaders in the Market and the Technology
North America is the global blockchain market leader and has the highest market share in the world. At the same time, it is home to some internationally prominent blockchain startups, such as Ripple and Bancor, and technology giants such as IBM and Microsoft, which are driving adoption in the region.
Bank of America has teamed up with Microsoft to develop blockchain applications for commercial finance driven by Microsoft Azure. The company also planned to file 20 patent applications with the USPTO in 2017.

Middle East - The Highest Rate of Adoption
The initiative of the Kingdom of Bahrain to adopt blockchain in the financial sector is driving rapid adoption in the Middle East, especially in cross-border payments, commerce and settlements, and automated issuing of bonds via smart contracts.
Israel is also playing a major role in this region, as it is home to some of the best-known blockchain startups worldwide.

Asia Pacific - The Developed Economies are Leading Adoption
The developed economies of the Asia Pacific region, such as Japan, China and South Korea, are leading adoption of blockchain in the region.
Furthermore, the Chinese government is driving the use of blockchain to increase transparency and combat fraud in the manufacturing and financial sectors.

Source: ACCIÓ based on data from Frost & Sullivan.
3. Blockchain in Catalonia
The Blockchain Ecosystem in Catalonia

35 companies

Those 35 companies currently have little economic impact but a strong potential for growth*

Emerging ecosystem: 60% of companies are less than 4 years old

The ecosystem consists predominantly of microenterprises

Those 35 companies interact with blockchain in a different way:

- As a facilitator technology: 19 companies (54%)
- Consultants providing advice on its use: 10 companies (29%)
- Specializing in cryptocurrency: 6 companies (17%)

*No data currently available on turnover or number of employees, because the companies are so new and because of the type of business.

Source: ACCIÓ based on Orbis
The Blockchain Ecosystem in Catalonia

Companies That Use Blockchain as a Facilitator Technology
- validatedID
- opentrends
- Xponent
- BLOC KTAC
- uniclau
- Scytl
- Artistic Island
- Konodrak
- Creativechain
- SHARGE
- finboot tech
- verse
- lemonpay
- FormalDocs
- smaze
- unify
- Authenticitys
- cocooking
- Private Investments
- UNICAT
- I AM TOGETHER

Consulting Companies
- NAKIMA
- Ubiquat Technologies
- Lean
- BTC Guardian
- xcapside
- ROCA JUNYENT
- BJT
- GroupBTC
- bisq
- cryptoranchia
- UBCRYPTO

Partial list.

Startups
- Partial list.

Note: These brands are used for information purposes only. The brands mentioned in this report belong to their respective owners. None of them is owned by ACCIÓ. This is a diagram of the main companies that form part of the blockchain ecosystem in Catalonia; there may be other companies in the sector that were not included in the study.*

*There may be other companies not detected during mapping because of the dynamic nature of the sector.
4. Trends and Applications by Demand Sector
Trends Impacted by Blockchain

Blockchain responds to the following macrotrends:

- Connectivity and convergence
- Innovating to Zero
- Future of energy
- ‘Smart is the New Green’
- New business models
- Future of mobility

The macrotrends that are being impacted by blockchain include information on green products and services, increased connectivity between devices and the IoT, the advent of new business models, the concept of Innovating to Zero (zero emissions, accidents, deaths, defects and security failures), a paradigm shift in mobility and the spread of a new energy model.

Source: ACCIÓ based on data from Frost & Sullivan.
Recent and Future Applications in Demand Sectors.

**Roadmap**

**Short term (2018)**
- Banking and finance
  - The impact will be seen in different areas such as cross-border payments, smart contracts and factoring.
- Retail
  - The impact will probably be seen in areas such as identification of counterfeit products and location of stolen goods.
- Healthcare
  - With the application of shared ledgers, smart contracts and encryption technology, pharmaceutical companies and medical-device manufacturers will be able to eliminate costly intermediaries and more effectively ensure safety, immutability, transparency, auditing and trust throughout the value chain.
- Energy
  - It makes it possible to ensure data coordination between a large variety of grids, allows for automated commerce platforms and creates open access for innovative products and services.
- Aerospace and defence
  - DARPA (Defense Advanced Research Projects Agency) is investing in blockchain to protect highly sensitive data on biological weapons and military satellites.
- Petroleum and gas
  - The impact will be seen in increased efficiency in offshore and onshore drilling processes and in the reduction of the cost of the operations.
- Public sector
  - One impact of blockchain on the public sector will be its potential implementation in electronic voting.

**Medium term (2019-2020)**

**Long term (from 2021)**

**Source:** ACCIÓ based on data from Frost & Sullivan, Cognizant.
**General Impact of Blockchain in the Future**

It is still too early to evaluate the impact that this technology will have if it becomes a new infrastructure. It has only been eight years since the appearance of Bitcoin, the cryptocurrency that changed the way trust and traceability mechanisms are established.

In the coming years, we will see whether this technology can change the way we interact as a society, without the need for central bodies to identify, validate or certify the validity of our actions.

### Positive impact

- Increased financial inclusion in emerging markets.
- Disintermediation of financial institutions, such as new services and exchanges of value created directly in the blockchain.
- Boom in saleable assets.
- Better property records in emerging markets and better traceability.
- Contracts and legal services increasingly linked to blockchain (smart contracts, guarantee deposits).
- Increased transparency: blockchain is essentially a database that records every transaction.

### Unknown Impact

- Central banks and monetary policy.
- Corruption.
- Taxes in real time.
- Role of government.

### Negative impact

Maintaining blockchains by means of the proof-of-work system involves a considerable use of energy, although it may be possible to switch to more efficient systems in the future.

Source: Authors' own data based on data from 8Wires
Take a look at the full report:
http://catalonia.com/export/sites/catalonia/content/documents/Block-chain-snapshot-EN-DEF.pdf

More information on the sector and related news: