Revolutionizing the Automotive Industry

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IFF at a glance

Cross-disciplinary research institute at the University of Nicosia (UNIC), focusing on technologies shaping the 4th industrial revolution. Our emphasis for 2020- 2021 is on two areas:
- **Blockchain**, including digital currencies and tokenized assets
- **Forecasting**, through the Makridakis Open Forecasting Centre (MOFC)

Academic Education & Professional Training

World's first **MOOC** on digital currencies

World's first academic degree on blockchain (**MSc in Digital Currency**)

Professional Training Programs

Research & Technology Development

Applied research projects
(EU research grants, industry funding)

Commercial spin-off
(Block.co)

Conferences & Events

World's premier blockchain learning conference & community (**Decentralized**)

Global forecasting research competition & conference (**M-competition**)
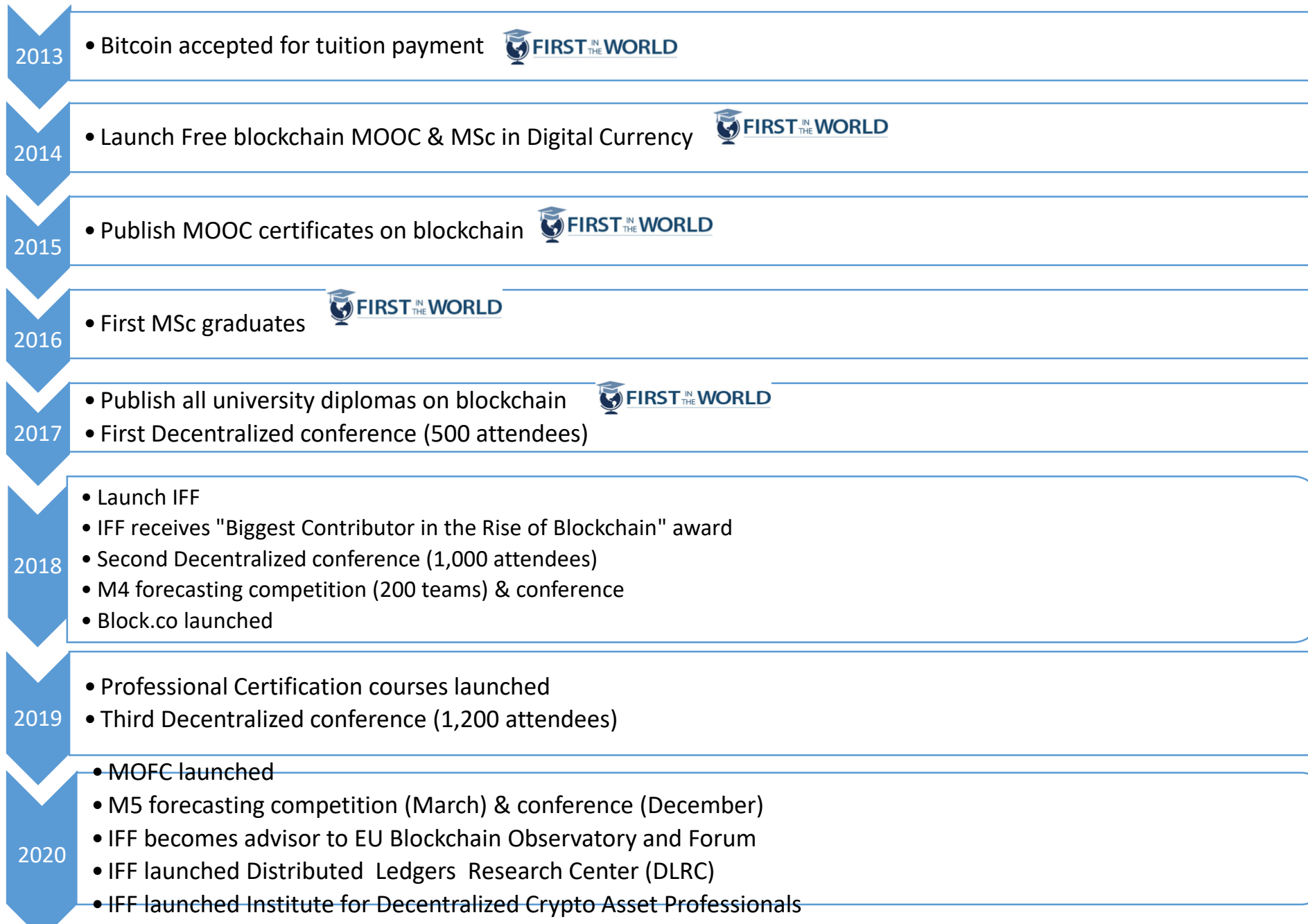
The Institute For the Future

Our **mission**:
- To explore and shape our future world, fueled by the technologies underpinning the 4th industrial revolution.

Our **vision**:
- To push the boundaries of knowledge in exponential technologies and to inspire our students to become technology leaders of tomorrow.

Our **goals**:
1. To bridge the supply/demand skill gap in emerging technologies through continuously evolving educational offerings to meet the changing needs of the market.
2. To build global communities of highly engaged learners and professionals.
3. To foster partnerships with academia and industry.
4. To carry out basic and applied research, commercializing its outcomes where relevant.

IFF Timeline

2013
- Bitcoin accepted for tuition payment FIRST IN THE WORLD

2014
- Launch Free blockchain MOOC & MSc in Digital Currency FIRST IN THE WORLD

2015
- Publish MOOC certificates on blockchain FIRST IN THE WORLD

2016
- First MSc graduates FIRST IN THE WORLD

2017
- Publish all university diplomas on blockchain FIRST IN THE WORLD
- First Decentralized conference (500 attendees)

2018
- Launch IFF
- IFF receives "Biggest Contributor in the Rise of Blockchain" award
- Second Decentralized conference (1,000 attendees)
- M4 forecasting competition (200 teams) & conference
- Block.co launched

2019
- Professional Certification courses launched
- Third Decentralized conference (1,200 attendees)

2020
- MOFC launched
- M5 forecasting competition (March) & conference (December)
- IFF becomes advisor to EU Blockchain Observatory and Forum
- IFF launched Distributed Ledgers Research Center (DLRC)
- IFF launched Institute for Decentralized Crypto Asset Professionals

IFF numbers

- **Largest student community in the world**
  - 45,000 MOOC participants from 110+ countries.
  - 900+ MSc students and graduates from over 95 countries, including USA (19%), UK (6%), Canada (5%), South Africa (4%), Brazil (3%), India (2%) and Australia (2%).

- **Accelerating research track record**:
  - €5m in competitive European Commission research grants since 2017.
  - Member of the Austrian Blockchain Center (€17m consortium, funded by the Austrian government)

- **Respected business & academic community organizer**:
  - Three annual Decentralized conferences with speakers including: Llew Claasen (*Director, Bitcoin Foundation*), Roger Ver (*CEO, Bitcoin.com*), Eva Kaili (*MEP*), Garrick Hileman (*Head of Research at Blockchain.com & Cambridge University*), etc.
  - Growing base of local Decentralized chapters: Nicosia, New York City, Mexico City, California, Amsterdam, Nigeria, Malta, Dubai, London, Thessaloniki, Brussels, Tokyo.

- **Strong team and partners**:
  - 8 full-time faculty and 15 affiliate faculty members within UNIC
  - 30+ resident and visiting researchers
  - 40+ university and industry partners
  - One commercial spin-off

Leaders in Blockchain Education

The Global Universities Embracing Cryptocurrency

#1 University of Nicosia
#2 University of Cumbria
#3 Simon Fraser University
#4 MIT
#5 New York University
#6 Duke University
#7 McGill University
#8 Pompeu Fabra University
#9 Imperial College

Source: Coindesk, 2015

Top 5 University Bitcoin Courses

#1 University of Nicosia
#2 New York University
#3 Stanford University
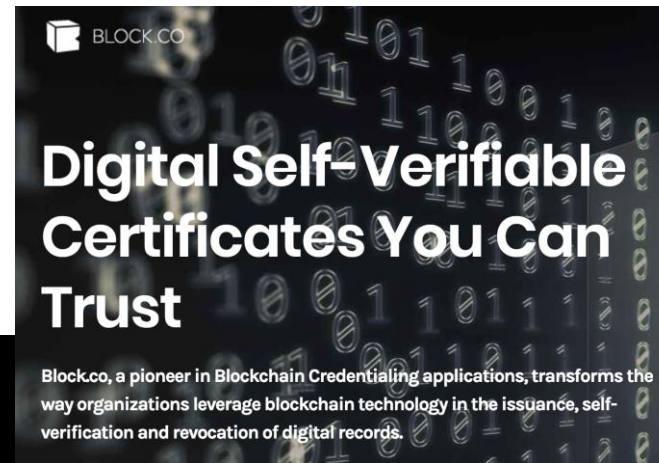#4 Princeton
#5 Duke University

Source: The Merkle, 2017

Top 5 Universities Offering Courses in Blockchain

#1 University of Nicosia
#2 Massachusetts Institute of Technology (MIT)
#3 Cornell University
#4 IT University of Copenhagen
#5 Indian Institute of Management Calcutta (IIM-C)

Source: The Medium, 2020

Leaders in blockchain research

Project	Budget	Funding by	Duration	IFF role
INFINITECH	€ 21m	EC (H2020)	3.25 years	Partner
ABC	€ 17m	Austrian govt	4 years	Partner
EUNOMIA	€ 2.4m	EC (H2020)	3 years	Partner
BLOCKPOOL.EU	€ 1.5m	EC (H2020)	2 years	Partner
DLT4ALL	€ 1m	EC (Erasmus+)	3 years	Coordinator
Direct industry funding	€ 1m	Ripple, trade.io, PumaPay, etc.	1-5 years	Main/sole partner
Blockchain Observatory	€ 1m	EC - Tender	30m	Partner

BLOCK.CO

Digital Self-Verifiable Certificates You Can Trust

Block.co, a pioneer in Blockchain Credentialing applications, transforms the way organizations leverage blockchain technology in the issuance, self-verification and revocation of digital records.

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Community Building

Decentralized Conference

Decentralized has established itself as Europe's premier conference on blockchain and crypto-currencies.

As the world goes online due to the coronavirus pandemic, Decentralized 2020 is adapting its format to continue the robust discussion surrounding the critical next steps in our Decentralized future.

The global conference series is set to return for a fourth year, this time reformatted as a series of dynamic webinars focused on learning.

Stay tuned for 2021!

DECENTRALIZED 2019

Last year's event was a huge success, bringing together more than 123 speakers and more than 1,000 participants from 53 countries, as well as 63 exhibitors, sponsors, media partners and supporters, to discuss the current status and future prospects of blockchain and digital currencies, as well as their industrial, corporate and governmental uses. Some of our speakers last year included:

- Dr Scott Stornetta, Chief Scientist at Yugen Partners
- Adam Back, CEO Blockstream
- David Chaum, CEO Elixxir
- Eva Kaili, MEP Chair STOA
- Garrick Hileman, Head of Research, Blockchain.com
- Dr Fabian Schuh, CTO BlockchainProjects BV
- Jeff Bandman, Founder and Principal of Bandman Advisors
- Tone Vays, Content Creator & Derivatives Trader

Academic Education & Professional Training Programs

1. **Master of Science in Blockchain Digital Currency**: **World's first Master's Degree focusing on Digital Currencies and Blockchain, with a flexible structure and taught in English** | Duration: 18 months | 90 ECTS | Online or On campus

2. **Blockchain Academic Certification Programs**: **Jump-start a career as 'blockchain business analyst', 'blockchain financial analyst' or 'blockchain developer'. Designed for people who want to become competent Blockchain professionals but do not wish to embark on a full academic program. Taught by leading faculty & practitioners** Duration: 18 weeks | 30 ECTS

3. **Blockchain Professional Certification Courses**: **Short, fully online, certification courses taught by industry experts and designed for working professionals** | Duration: 6 weeks

    Professional Certificate Course - Blockchain Law, Regulation and Policy

    Professional Certificate Course - Security Token Strategy

    Professional Certificate Course - Blockchain & Energy

    Professional Certificate Course - Applied Forecasting

4. **Blockchain Regulatory Academy**: **Online interactive masterclass, taught by Jeff Bandman, designed for professionals and blockchain enthusiasts in legal, regulation and policy making** | Duration: 3 hours

Institute for Decentralized Crypto Asset Professionals

IDCAP

IDCAP Certification

Establish the trust your customers and regulators need for you to reap the opportunities in crypto asset markets

DECENTRALIZED

Decentralized Community

Be connected within the crypto asset community, keeping on top of latest developments, and find the resources you need
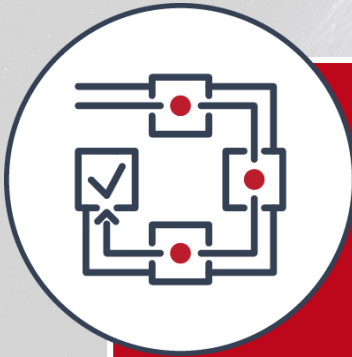
What is IDCAP?

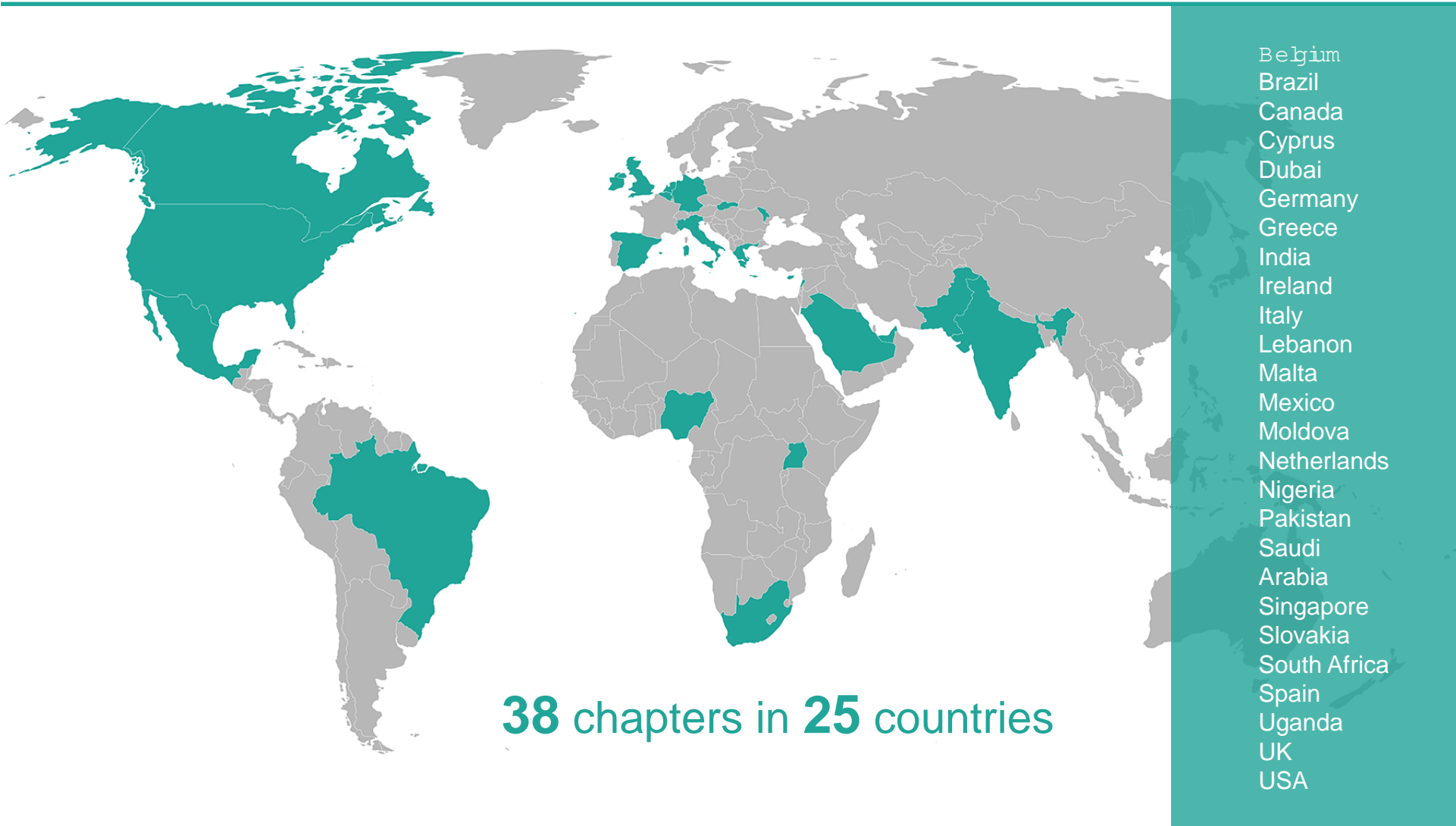IFF and others have offered high quality crypto asset education for years

BUT

There is no established rigorous certification process

IDCAP Certification is the first crypto asset certification you can trust

A thriving global Decentralized community

38 chapters in **25** countries

Belgium
Brazil
Canada
Cyprus
Dubai
Germany
Greece
India
Ireland
Italy
Lebanon
Malta
Mexico
Moldova
Netherlands
Nigeria
Pakistan
Saudi
Arabia
Singapore
Slovakia
South Africa
Spain
Uganda
UK
USA

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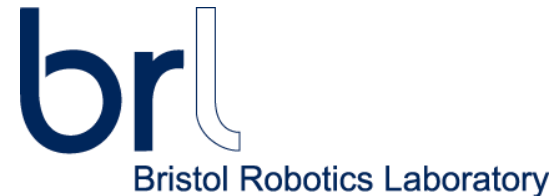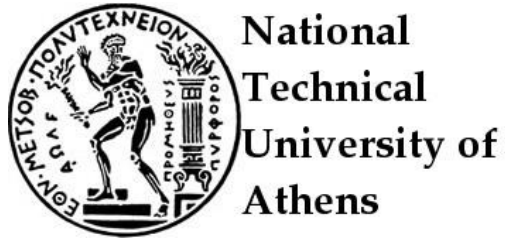**Valentinos Theofilou**

Demetrios Tseas

Gamaliel Dafe Tuoyo

Marianna Charalambous

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ABC
AUSTRIAN BLOCKCHAIN CENTER

ΔΗΜΟΣ ΑΓΙΑΣ ΝΑΠΑΣ
AYIA NAPA MUNICIPALITY

OPEN MUSIC
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armenian blockchain association
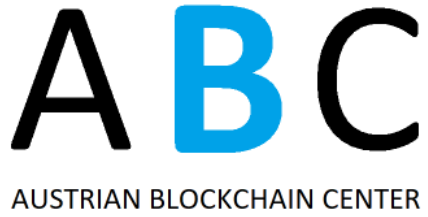
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EU Blockchain
Observatory and Forum

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.... And many more as new members join every month

The Automotive Industry

Contents

- Blockchain -An Introduction
- Benefits of blockchain in the automotive industry
- Use Cases: Stakeholders, the Challenges faced and Blockchain
- Taking Advantage of Blockchain Technology
- Weaknesses of Blockchain Technology

Blockchain -An Introduction

The Origin

Blockchain was introduced, in 2008, as the technology underlying Bitcoin, the platform and cryptocurrency that has gained immense popularity due to the upward trend in the value of bitcoins.

The Potential

Despite it being invented to support Bitcoin, important stakeholders from various industries recognized its potential and started exploring applications of the technology to either improve current practices, or create news one that were not possible until now.
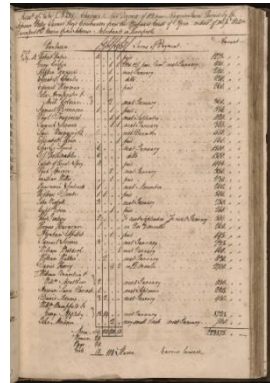
Blockchain –An Introduction

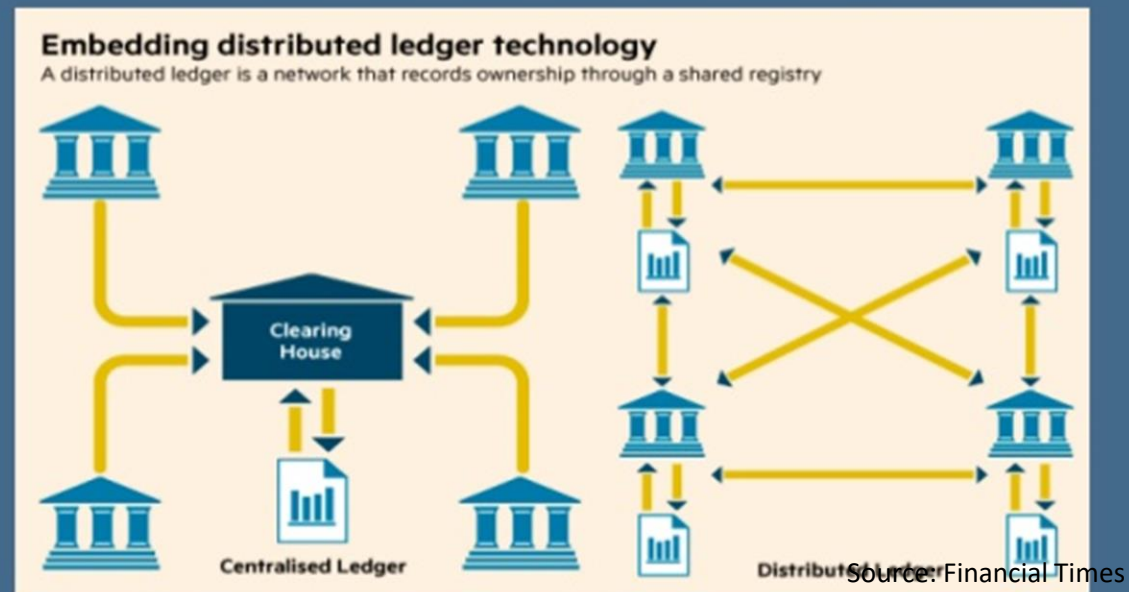❑ A distributed ledger of any type of transactions;

  ❑ Transactions – exchange of data that represent medical data, consumer details, product data….

  ❑ A decentralized network for peer-to-peer transactions, **without the need for a central/trusted/third party;**

  ❑ Once added to the rest of the chain, the records cannot be modified;

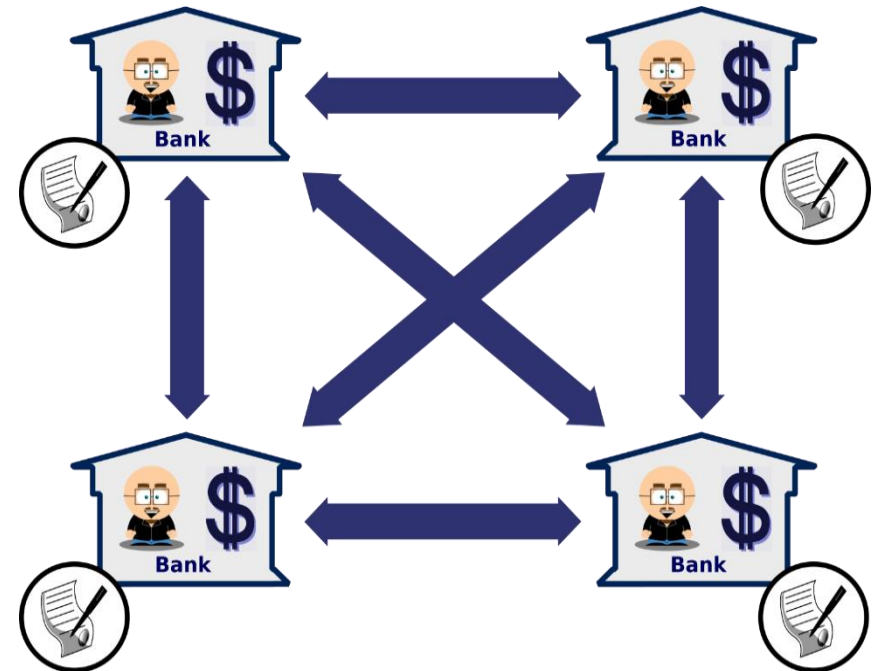## Centralized vs distributed ledgers

Embedding distributed ledger technology
A distributed ledger is a network that records ownership through a shared registry

Clearing House

Centralised Ledger

Distributed Ledger
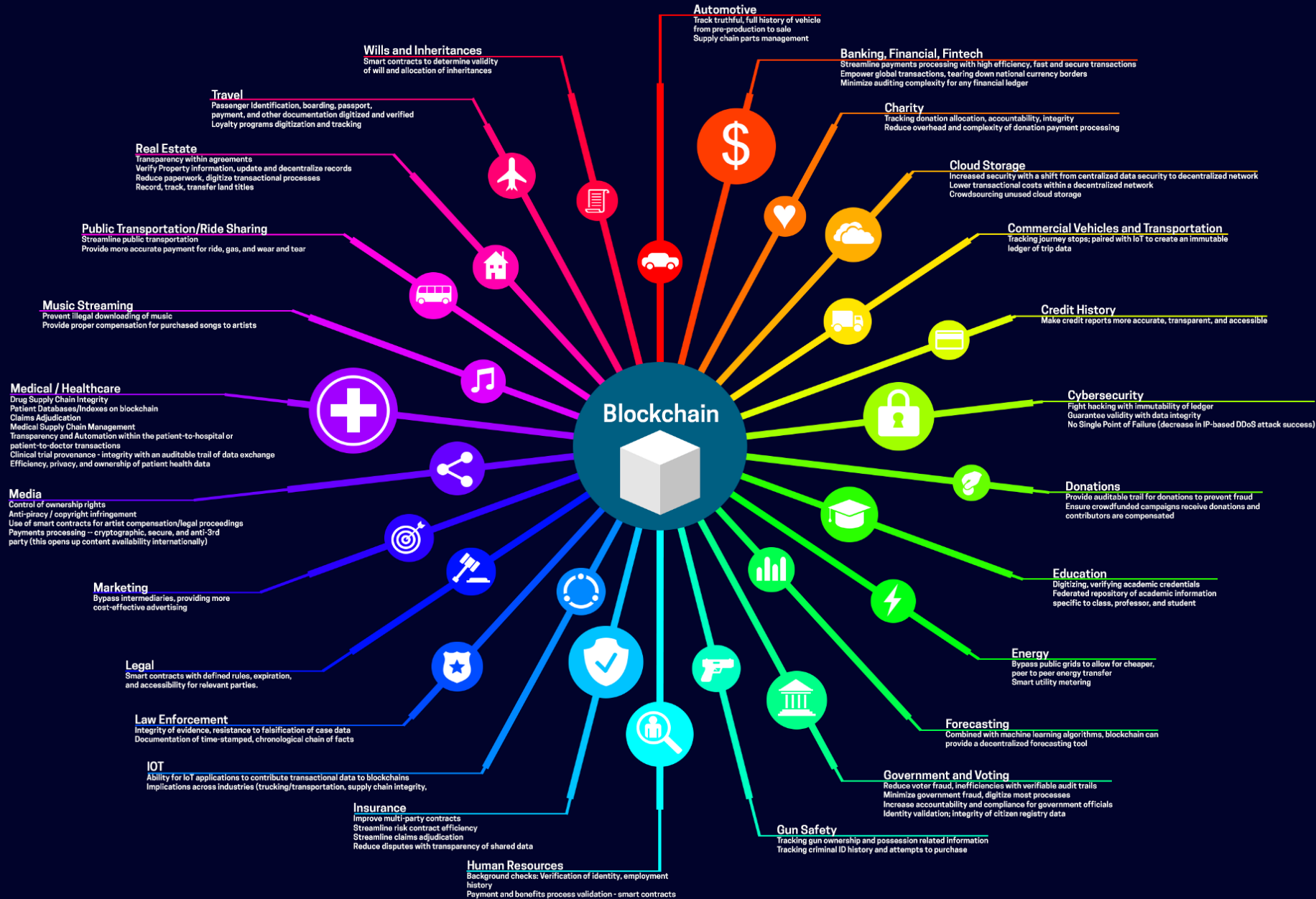
Source: Financial Times

Financial Times

Blockchain - An Introduction

- **Shared:** blockchains do not make much sense unless two or more parties (or systems) are involved
- **Time-stamped:** transactions are stored in chronological order
- **Append-only**: you can only add new transactions to a blockchain. **Immutable**: Once written, a transaction cannot be erased or altered
- **Cryptographically-secured**: advanced cryptography enables all the above
- **Enables smart contracts:** can be programmed so that certain conditions are met
  ➔ And therefore various business rules execution can be automated
- **Enables distributed consensus**

Blockchain -An Introduction

- **Blockchains** eliminate the need of the central ledger;

- Consist of blocks that hold batches of valid transactions;

- Can be open, verifying anonymous actors in the network;

or

- they can be closed and require actors in the network to be identified;

A growing list of use cases

https://medium.com/fluree/blockchain-for-2018-and-beyond-a-growing-list-of-blockchain-use-cases-37db7c19fb99

Benefits of blockchain in the automotive industry

▌ **Tamper-proof data**: Once a transaction is created in the blockchain, a new timestamp is recorded so that further modifications after such a timestamp will not be allowed

▌ **No single point of failure**: 2 main reasons

1. Blockchain performs data recording and storing using synchronous communication among the nodes through open-source sharing protocols. Open-source code has the advantage of being less prone to be altered by malicious parties, since it is monitored continuously by multiple contributors.

2. A full blockchain node (one that validates transactions) has a copy of the full blockchain ➔ fault tolerance

Benefits of blockchain in the automotive industry

- **Privacy:** Blockchain uses public-key cryptography for providing security and privacy

- **Identity Management**: in a traditional system (centralized with intermediaries) the identity provider controls the authorization of the different entities (for humans and devices)
  - In the decentralized approach
    - Blockchain identity management systems could be used to eradicate current identity issues such as
      - Inaccessibility
      - Data insecurity
      - Fraudulent identities
    - User-centric schemes: the identity is owned and controlled by the single end-user - e.g., network anonymization
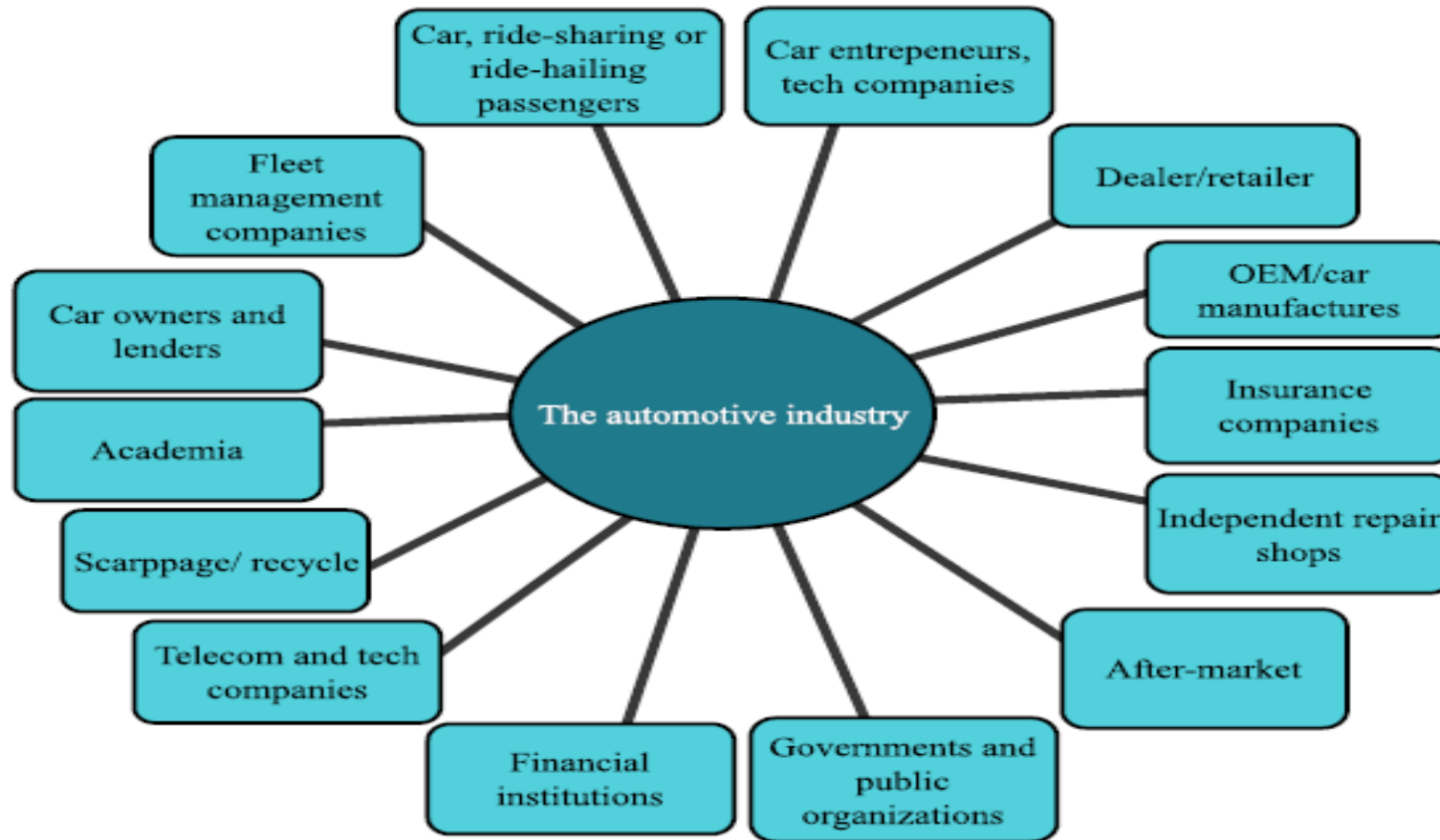
Benefits of blockchain in the automotive industry

◤ **Access management:** represents the policies, processes and tools to identify, control and manage the authorized access to a system or application

◤ **Information security:** 3 main properties of the exchanged information should be preserved in order to consider it secure

  ◤ Confidentiality: Unauthorized accesses should not be allowed

  ◤ blockchain decentralizes storage ➔ if a node becomes compromised, the rest of the system may operate normally

  ◤ the confidentiality of a user is also preserved through his/her private key

  ◤ Integrity: prevents data modifications from unauthorized users (by definition)

  ◤ Availability: the possibility of accessing the system data when needed

  ◤ A blockchain guarantees the availability by distributing data among peers

Benefits of blockchain in the automotive industry

Smart contract enforcement and autonomy: to automate the contractual business processes.

- Smart contracts are verified and signed when they are distributed across the business network.

- A smart contract is actually a piece of decentralized code that is stored on the blockchain and that runs autonomously when certain conditions are fulfilled. Therefore, there is no concept of reneging on a smart contract

Use Cases: Stakeholders, the Challenges faced and Blockchain

Stakeholders in the Automotive Industry

P. Fraga-Lamas and T. M. Fernández-Caramés, "A Review on Blockchain Technologies for an Advanced and Cyber-Resilient Automotive Industry," in IEEE Access, vol. 7, pp. 17578-17598, 2019, doi: 10.1109/ACCESS.2019.2895302.

Use Cases: Stakeholders, the Challenges faced and Blockchain

◥ Car owners and lenders and Fleet management companies/car leasing/sharing
  - ◥ Lack of transparency in terms of the car history
  - ◥ Unpredictable car maintenance and repair jobs
  - ◥ Lack of trust in autonomous connected cars

◥ Car manufacturers and suppliers
  - ◥ High warranty claim costs
  - ◥ Enforcement of recommended maintenance and recommended related prices set by manufacturers
  - ◥ Cyber attacks, system failure risks and enhanced security in autonomous cars and connected ones
  - ◥ In logistics/supply chains

Use Cases: Stakeholders, the Challenges faced and Blockchain

- **Governments and public organizations**
  - State registries (ownership rights, vehicle taxes, traffic fines….)
  - Greater anonymization/pseudo-anonymization in data collection and processing and provision of information
  - Notifications of road conditions/traffic congestions
  - Trusted data for accident investigation

- **Financial institutions for leasing and car financing**
  - Updated car ownership records
  - Smart contracts to optimize and automate various processes

- **Telecommunications and tech companies content and service providers**
  - Stable and secure car-to-car and car-to-infrastructure communication and safe car coordination
  - Lack of trusted connectivity among cars and infrastructures

Source: https://www.slideshare.net/VasiliySuvorov/blockchain-for-automotive-industry

Taking Advantage of Blockchain Technology

- Blockchain based systems:
  - Can provide operational efficiency and resiliency
  - Can provide real time visibility, transparency and data quality and avoid problems in financial settlements and registration/maintenance/insurance... data
  - By removing middlemen, transactions can be simplified and their cost can be lowered (e.g., banking fees).
  - The use of smart contracts enables autonomous transactions (e.g., decisions on business processes) based on data acquired by IoT devices or sent by different stakeholders
  - Can help avoid cyberattacks as the data structure they provide is both safe and transparent
  - M-to-M transactions for autonomous cars

Weaknesses of Blockchain Technology

▰ Technology maturity

▰ Regulatory framework

▰ Consumer protection

▰ Standards to use blockchain on an industrial scale are still not in place

▰ Replacing existing infrastructure – time and investment

References

- Blockchain for Automotive Industry,

https://www.slideshare.net/VasiliySuvorov/blockchain-for-automotive-industry

- P. Fraga-Lamas and T. M. Fernández-Caramés, "A Review on Blockchain Technologies for an Advanced and Cyber-Resilient Automotive Industry," in IEEE Access, vol. 7, pp. 17578-17598, 2019, doi: 10.1109/ACCESS.2019.2895302,

https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8626103