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Permissioned Distributed Ledger (PDL); Research and Innovation Landscape

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Foreword

This Group Report (GR) has been produced by ETSI Industry Specification Group (ISG) Permissioned Distributed Ledger (PDL).

Modal verbs terminology

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Executive summary

The present document gives an overview of relevant research and standardization projects in the field of permissioned distributed ledgers and Blockchain, in particular identifying projects from the EU's Horizon 2020 programme, the US' National Science Foundation's programme, national programmes in the UK and Germany, in addition to worldwide standardization activities in this field.

Introduction

Clause 4 introduces research and innovation programmes relevant to permissioned distributed ledgers, in particular the European Union's Framework Programme Horizon 2020 and its primary information repository, the Community Research and Development Information Service (CORDIS). Clause 5.1 gives a general overview of the EU's Horizon 2020 Framework Programme, its successor Horizon Europe and the Connecting Europe Facility (CEF), while clause 5.2 focuses on the legal framework for standardization and an overview of blockchain-related standardization activities.

Clause 6 provides an overview of public research and innovation programmes and grants related to PDL, covering the EU in more detail, and in addition national programmes in Germany, the UK and the US. Clause 7 emphasizes the importance of PDL standardization. Annex A identifies in detail those EU Horizon 2020 projects that are related to DLT and Blockchain, sorted by project name, while Annex B identifies for those same projects the related Horizon 2020 research topics and thematic priorities. Finally, Annex C lists US National Science Foundation (NSF) projects related to DLT and Blockchain.

1 Scope

The present document shows the current research and innovation programmes related to permissioned distributed ledgers, distributed digital ledger technologies and blockchain with the goal of identifying advanced technologies and innovative research results relevant or essential to PDL standardization.

2 References

2.1 Normative references

Normative references are not applicable in the present document.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI GR PDL 001 (V1.1.1): "Permissioned Distributed Ledger (PDL); Landscape of Standards and Technologies".

NOTE: Available at https://www.etsi.org/deliver/etsi_gr/PDL/001_099/001/01.01.01_60/gr_PDL001v010101p.pdf.

[i.2] European Commission CORDIS: "CORDIS: Projects and Results".

NOTE: Available at https://cordis.europa.eu/projects/en.

[i.3] European Commission, DG for Communication Networks, Content and Technology Call for tenders /(25-11-2020): "(European Commission Call for tenders CNECT/2020/OP/0055),EU Blockchain Pre-commercial Procurement, Open procedure, Tender Specifications".

NOTE: Available at https://etendering.ted.europa.eu/cft/cft-document.html?docId=81917; https://etendering.ted.europa.eu/document/document-file-download.html?docFileId=95923.

[i.4] European Union Regulation (1025/2012).

NOTE: Available at https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012R1025&from=EN

[i.5] ETSI Annual Report 2019, published in 2020.

NOTE: Available at https://www.etsi.org/e-brochure/Annual-Reports/AR-202012/mobile/index.html.

[i.6] EC Rolling Plan for ICT Standardization, Published April 2021.

NOTE: Available at https://joinup.ec.europa.eu/collection/rolling-plan-ict-standardisation/rolling-plan-2021 , the Rolling Plan addresses technology areas in need of ICT standards and explores the role that standards and technical specifications can play in achieving the policy objectives. It reaches out to both European Standardisation Organisations (ESOs) -ETSI, CEN and CENELEC and aforementioned global standard development bodies that can respond to the proposed actions and support the respective policy objectives with standardisation deliverables.

[i.7] European Commission Horizon 2020 Work Programme /(2020-06-17): "EN Horizon 2020 Work Programme 2018-2020, 5.i. Information and Communication Technologies".

NOTE: Available at https://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-leit-ict_en.pdf.

[i.8] European Commission European Research Council 2021 Work Programme /(2021-02-22): "(European Commission Decision C(2021) 930 of 22/02/2021), ERC Work Programme 2021, European Research Council".

NOTE: Available at https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021/wp_horizon-erc-2021_en.pdf.

[i.9] Federal Ministry for Economic Affairs and Energy, Federal Ministry of Finance/(2019-09-18): "Blockchain Strategy of the Federal Government, We Set Out the Course for the Token Economy".

NOTE: Available at https://www.bmwi.de/Redaktion/EN/Publikationen/Digitale-Welt/blockchain-strategy.pdf.

[i.10] T. Faisal et el.: "Automated Quality of Service Monitoring for 5G and Beyond Using Distributed Ledgers", IWQoS 2021.

[i.11] T. Faisal et el.: "How to Request Network Resources Just-in-Time using Smart Contracts", ICBC 2021.

[i.12] T. Faisal et el.: "AJIT: Accountable Just-in-Time Network Resource Allocation with Smart Contracts", MobiArch 2020.

[i.13] T. Maksymyuk, M. Volosin, G. Bugar, D. Horvath, J. Gazda, M. Klymash and Mischa Dohler: "Blockchain-Based Comprehensive Network Management in 5G and Beyond," IEEE Communications Magazine, accepted 23 August 2020.

[i.14] C. Ngubo, Mischa Dohler: "WiFi Dependent Consensus Mechanism For Constrained Devices using Blockchain Technology," IEEE Access (Journal), accepted 24 July 2020.

[i.15] R. Pirmagomedov, et al, and Mischa Dohler: "Applying Blockchain Technology for Users Incentivization in mmWave-based Mesh Networks," IEEE Access (Journal), accepted 17 Feb 2020.

[i.16] Setting standards for the future.

NOTE: Available at https://www.sofie-iot.eu/news/setting-standards-for-the-future.

[i.17] 5GZorro.

NOTE: Available at https://www.5gzorro.eu/our-objectives/.

3 Definition of terms, symbols and abbreviations

3.1 Terms

Void.

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

5G-CORAL	5G Convergent Virtualized Radio Access Network Living at the Edge (H2020 project)
AEGIS	Advanced Big Data Value Chain for Public Safety and Personal Security (H2020 project)
AGILE	Adoptive Gateways for dIverse muLtiple Environments
AI	Artificial Intelligence
AJIT	Accountable Just-in-Time Network Resource Allocation (H2020 project)
ANITA	Advanced tools for fighting oNline llegal TrAfficking (H2020 project)
API	Applications Programming Interface
ATARCA	Accounting Technologies for Anti-Rival Coordination and Allocation (H2020 project)
ATM	Air Traffic Management
BBI-CSA	Bio-Based Industries - Coordination and Support Action
BCDMA	Blockchain Division Multiple Access
BDLT	Blockchain and DLT
BDTI	Big Data Test Infrastructure
BMBF	German Federal Ministry of Education and Research (Bundesministerium für Bildung und Forschung)
BMWi	German Federal Ministry for Economic Affairs and Energy (Bundesministerium für Wirtschaft und Energie)
CAPS	Collective Awareness Platforms
CBDC	Central Bank Digital Currency
CCF	Connecting Capability Fund
CEF	Connecting Europe Facility
CEITER	Cross-border Educational Innovation thru Technology-Enhanced Research
CEN	European Committee for Standardization (Comité Européen de Normalisation)
CENELEC	European Committee for Electrotechnical Standardization (Comité Européen de Normalisation Électrotechnique)
COG-LO	COGnitive LOgistics Operations through secure, dynamic and ad-hoc collaborative networks (H2020 project)
COPA	COllaborative Platform for trAnsmedia storytelling and cross channel distribution of EUROPE
CORDIS	Community Research and Development Information Service
CPN	Content Personalization Network
CREST	Fighting Crime and TerroRism with an IoT-enabled Autonomous Platform based on an Ecosystem of Advanced IntelligEnce, Operations, and InveStigation Technologies (H2020 project)
CRUE	H2020 project
CSA	Coordination and Support Action
CSA-LS	Coordination and Support Action Lump Sum
CUREX	seCUre and pRivate hEalth data eXchange (H2020 project)
DFS	Democratized Financial Services (H2020 project)
DG CNECT	Directorate-General for Communications NEtworks, Content and Technology
DLT	Distributed Ledger Technology
DSISCALE	Digital Social Innovation in Europe (H2020 project)
DSO	Distribution System Operator (of electricity)
EBSI	European Blockchain Services Infrastructure
EBSIS	Event Based Systems (H2020 project)
EC	European Commission
ECHO	European network of Cybersecurity centres and competence Hub for innovation and Operations (H2020 project)
ECSEL-RIA	ECSEL Research and Innovation Action
ECSO	European Cyber Security Organisation
EECTI	Spanish National Strategy for Science, Technology and Innovation
EGNSS	European Global Navigation Satellite System
EHR	Electronic Health Record
EIC	European Innovation Council
eIDAS	Electronic IDentification, Authentication and trust Services
EIT	European Institute of Innovation and Technology
ENIT	Energy IT Systems

NOTE: ENIT is a spinoff company of Fraunhofer Society (German research society).

ENVRI PLUS	Environmental Research Infrastructures Providing Shared Solutions for Science and Society (H2020 project)
EPES	Electrical Power and Energy System
EPSRC	Engineering and Physical Sciences Research Council
ERA	European Research Area
ERC	European Research Council
ESFRI	European Strategy Forum on Research Infrastructures
ESI Europe	Energy Savings Insurance in Europe (H2020 project)
ETSI	European Telecommunications Standards Institute
EU	European Union
EUOS	EU Observatory for ICT Standardisation (H2020 project)
EV	Electric Vehicle
EVEARA	H2020 project
FENTEC	Functional Encryption Technologies project (H2020 project)
FET	Functional Encryption Technologies
FINSEC	Integrated Framework for Predictive and Collaborative Security of Financial Infrastructures (H2020 project)
FISHY	Coordinated framework for cyber resilient supply chain systems over complex ICT infrastructures (H2020 project)
FOrLedger	Blockchain-based Middleware Platform for Food Tracking Ledger Builder
FTI	Fast Track to Innovation
GDC	Genetic Data CUBE (H2020 project)
GDM	Data Marketplace deployment (H2020 project)
GDPR	General Data Protection Regulation
GOIN	H2020 project
GRECA	H2020 project
H2020	Horizon 2020
HEIF	Higher Education Innovation Fund
HEP	Higher Education Providers
HMCS	Handheld Molecular Contaminant Screener (H2020 project)
HPC	High-Performance Computing
IA	Innovation Action
ICARUS	Aviation-driven Data Value Chain for Diversified Global and Local Operations (H2020 project)
ICN	Information-Centric Networking
ICONET	New ICT infrastructure and reference architecture to support Operations in future PI Logistics NETworks (H2020 project)
I-Corps	Innovation Corps
ICT	Information and Communication Technologies
IETF	Internet Engineering Task Force
IMI2-RIA	Innovative Medicines Initiative 2 - Research and Innovation Action
INEA	(European Commission's) Innovation and Networks Executive Agency
INNOSUPSME	Innovation Support for SME
IoT	Internet of Things
IP	Intellectual Property
IRTF	Internet Research Task Force
ISO	International Organization for Standardization
ITA	Innovations and Technologies Analysis
KIOS CoE	KIOS Research and Innovation Center of Excellence
KYC	Know Your Customer
LAN	Local Area Network
LPS	Laptop Pocket Server
MDOT	Medical Device Obligations Taskforce (H2020 project)
MH-MD	My Health - My Data (H2020 project)
MSCA	Marie Skłodowska-Curie Actions
NECOS	Novel Enablers for Cloud Slicing (H2020 project)
NeTS	Networking Technology and Systems
NFV	Network Functions Virtualisation
NGI	Next Generation Internet
NGO	Non-governmental Organisation
NIMBLE	Collaboration Network for Industry, Manufacturing, Business and Logistics in Europe (H2020 project)

NIS	Network and Information Systems
NRG-5	Enabling Smart Energy as a Service via 5G Mobile Network advances (H2020 project)
NSF	National Science Foundation
PARITY	Pro-sumer AwaRe, Transactive Markets for Valorization of Distributed flexibilITY enabled by Smart Energy Contracts (H2020 project)
PCCE	Pricing carbon with a dedicated currency to empower economic agents (H2020 project)
PCHP	PeachPie Compiler Platform (H2020 project)
PCP	Pre-Commercial Procurement
PDL	Permissioned Distributed Ledger
PHP	PHP Hypertext Preprocessor
PLM	Project Lifecycle Management
PPP	Public-Private Partnership
PV	Photo-Voltaic
RCM	Rail-Care Maintenance
RESISTO	RESIlience enhancement and risk control platform for communication infraSTructure Operators (H2020 project)
RIA	Research and Innovation Action
RISE	Research Center on Interactive Media, Smart System and Emerging Technologies (H2020 project)
SAGRIS	Sentinels-based Agriculture Information Service Component (H2020 project)
SaTC	Secure and Trustworthy Cyberspace
SBIR	Small Business Innovation Research
SDN	Software Defined Network
SELIS	Towards a Shared European Logistics Intelligent Information Space (H2020 project)
SERUMS	Securing Medical Data in Smart Patient-Centric Healthcare Systems (H2020 project)
SESAR-RIA	Single European Sky ATM Research - Research and Innovation Action
SGA-CSA	Specific Grant Agreement - Coordination and Support Action
SHAR-Q	Storage capacity sharing over virtual neighbourhoods of energy ecosystems (H2020 project)
SIEM	Security Information Event Management
SKIN	Short supply chain Knowledge and Innovation Network (H2020 project)
SLA	Service-Level Agreement
SMASH	Smart Sharing (H2020 project)
SME	Small- and Medium-sized Enterprise
SME-1	Small- and Medium-sized Enterprise Instrument Phase 2
SME-2	Small- and Medium-sized Enterprise Instrument Phase 2
SME-2b	Small- and Medium-sized Enterprise Instrument (grant only and blended finance)
SMESEC	Protecting Small and Medium-sized Enterprises digital technology through an innovative cyber-SECurity framework (H2020 project)
SOFIE	Secure Open Federation for Internet Everywhere (H2020 project)
SOTER	cyberSecurity Optimization and Training for Enhanced Resilience in finance (H2020 project)
SPHINX	Universal Cyber Security Toolkit for Health-Care Industry (H2020 project)
STMS	Smart Tyre Management System for Safer, Greener and More Economic Transport (H2020 project)
STTR	Small business Technology Transfer
TALENT SWARM	H2020 project
TCBL	Textile and Clothing Business Labs Transformative Business Models for the Textile Clothing Sector (H2020 project)
TEN-T	Trans-European Transport Network
TNT	Truth-not-Trust (H2020 project)
TOKEN	Transformative Impact Of BlocKchain tEchnologies iN Public Services (H2020 project)
TOOP	The Once Only Principle
TRESCA	Trustworthy, Reliable and Engaging Scientific Communication Approaches (H2020 project)
TSO	Transmission System Operators (for electricity supply)
TWG BLOCK	Technical Working Group BLOCKchain (of StandICT.eu project)
UK	United Kingdom
US	United States
VAT	Value-Added Tax
WLAN	Wireless LAN
ZSM	Zero touch network & Service Management

4 PDL Research and Innovation Landscape

4.1 Introduction

The present document discusses the current research and innovation programmes related to permissioned distributed ledgers, distributed digital ledger technologies and blockchain with the goal of identifying advanced technologies and innovative research results relevant or essential to PDL standardization. Without limitation to other research and innovation initiatives, the present document focuses on PDL research and innovation activities funded under the European Union's Research and Innovation Framework Programme Horizon 2020.

4.2 Related Documents and Information Sources

The present document relates to the Permissioned Distributed Ledger (PDL) Landscape of Standards and Technologies Annex B: List of EU funded Horizon 2020 Research and Innovation Projects on Blockchain and/or Distributed Ledger (ETSI GR PDL 001 [i.1]).

For the identification of Horizon 2020 Research Projects related to blockchain and DLT the Community Research and Development Information Service (CORDIS) [i.2] has been used. CORDIS serves as the European Commission's primary source of information on results from projects funded under the European Research Framework Programmes. CORDIS itself is governed and funded as part of the EU Horizon 2020 research framework programme.

The CORDIS public repository with Horizon 2020 project information held by the European Commission provides search functionalities that have been used to identify projects that have blockchain or distributed ledger technologies in any of their objectives, work program, deliverables, results or publications mentioned.

5 European Research Programmes and EU Standardization

5.1 Research

5.1.1 Research introduction

In Europe, research and innovation has a high priority. The EU provides funding for research projects in Europe within the EU-Framework Programmes for Research. These Programmes have been established since 1984 with the overall objective to strengthen the competitiveness and growth of the European market.

5.1.2 Horizon 2020

Horizon 2020 is the 8th EU Framework Programme for Research and Innovation. Reflecting on the growing importance of innovation from previous EU Framework Programmes for Research the Horizon 2020 Framework Programme has a strong focus on Innovation. In particular Horizon 2020 has implemented instruments for scaling-up the ICT innovation ecosystem in Europe. Support for ICT innovation plays a central role in Horizon 2020 together with the creation of better framework conditions for innovation in Europe through ICT standardization. The ICT innovation strategy is to ensure that the rapidly changing ICT technology directly transforms into substantial benefits for European citizens and society.

Horizon 2020 is funding research projects covering the whole innovation chain from foundational research towards the preparation of market-ready products. With a total budget of about 80 billion euros over a runtime of seven years, i.e. from 2014 to 2020, Horizon 2020 has been one of the largest research and innovation funding programmes worldwide.

- Horizon 2020 is structured into the three research and innovation programme priorities: Excellent Science
- Leadership in Enabling and Industrial Technologies
- Societal Challenges

An overview of the overall EU Horizon 2020 signed grants over the period from 2014 to 2020 is provided in Figure 5.1, whereby the information was retrieved from the EU Horizon Dashboard website https://webgate.ec.europa.eu.

Figure 5.1: Overview on EU Horizon 2020 signed grants by signature year and end year

5.1.3 Horizon Europe

Horizon Europe is the successor of Horizon 2020 and will be the largest EU Research and Innovation Framework Programme following up on the implementation and maintenance of well-established programmes from Horizon 2020 with a budget of around 95,5 billion euro over a runtime of seven years from 2021 until 2027.

Horizon Europe is set out to strengthen research and innovation in Europe further and to drive the digital transformation for supporting the creation of innovative services and new markets and to provide more targeted solutions to global and societal challenges. Horizon Europe has the objective to create impact more effectively through a clear mission orientation and a strategy towards active engagement and involvement of society and citizens as well as stronger dissemination and exploitation of research and innovation results. With an exclusive focus on civil applications the specific programme implementing Horizon Europe is structured into the three priority areas:

- excellent science;
- global challenges and European industrial competitiveness; and
- innovative Europe.

The 'Excellent Science' work programme comprises 'European Research Council' (ERC), 'Marie Skodowska-Curie' and 'Research Infrastructures' actions set up to strengthen excellent European science and technology through more investments into individual and highly skilled researchers and leading-edge innovations.

The 'Global Challenges & European Industrial Competitiveness' work programme is set-up to advance the industrial competiveness and innovation capacities of the EU. It encompasses funding of research activities through clusters relating to global challenges (i.e. 'Health'; 'Culture, Creativity and Inclusive Society'; 'Civil Security for Society'; 'Digital Industry and Space', 'Climate, Energy and Mobility'; 'Food, Bio economy, Natural Resources, Agriculture and Environment') and also includes support activities by the 'Joint Research Centre' for policies.

The 'Innovative Europe' work programme is grouped into 'European Innovation Council' (EIC), 'European Innovation Ecosystems' and 'European Institute of Innovation and Technology' (EIT) activities. The Horizon Europe Research and Innovation Programme is based on the Widening Participation and Strengthening the European Research Area (ERA).

In order to provide solutions to major societal challenges, research and innovation missions will be an integral part of the Horizon Europe Framework Programme. Missions and related actions will be launched under Horizon Europe in the five areas:

- 'Adaptation to climate change including societal transformation'
- 'Cancer'
- 'Climate-neutral and smart cities'
- 'Healthy oceans, seas, coastal and inland waters'
- 'Soil health and food'

The missions will be implemented through a range of dedicated actions from research projects, policy measures towards legislative initiatives thus complementing the scope and effectiveness of individual actions and contributing to the Sustainable Development Goals, to the goals of the European Green Deal and the Beating Cancer Plan.

5.1.4 Other Research Funding Programmes

The Connecting Europe Facility (CEF) run by the European Commission's Innovation and Networks Executive Agency (INEA) is a fund for European infrastructure investments in transport, energy as well as digital projects leveraging not only intra- but also cross-border connectivity within and between the EU member states. CEF funding and grants are organized through calls for proposals are particularly set out to support the adoption of the CEF Building Blocks.

CEF Building Blocks are most commonly needed digital services based on European legislation and standards helping to implement the development and adoption of the required digital infrastructures in a more efficient way by using existing technologies and synergies. The European Commission's Directorate-General for Communications Networks, Content and Technology (DG CNECT) is responsible for managing the Digital Agenda and is defining the CEF Building Blocks. Among the currently available CEF Building Blocks including eID, eDelivery, eInvoicing, eSignature, Context Broker, eArchiving, eTranslation and the Big Data Test Infrastructure (BDTI), in the context of DLT related Research and Innovation programmes the CEF Building Block European Blockchain Services Infrastructure (EBSI) needs to be highlighted. The goal of the CEF EBSI also described in ETSI GR PDL 001 [i.1] is to provide cross-border pan-European public services using blockchain technology with the highest standards of security and privacy.

In November 2020, the EC launched a call for tenders on EU Blockchain Pre-Commercial Procurement (PCP) [i.3] for novel, innovative distributed ledger or blockchain solutions helping to establish the future European Blockchain Services Infrastructure for the European Citizens in compliance with the EU legal framework (i.e. GDPR, eIDAS and NIS Directive). In particular the PCP call is set out to support a number of new types of use cases with high-volume and high-velocity requirements improving interoperability, security, robustness and sustainability of EBSI. The European Blockchain PCP will award Research and Development service contracts to a number of blockchain solution providers for the development of innovative solutions covering all phases from design, prototyping towards installation and testing. Among others these solutions should provide for identification and traceability of objects, and the management of their data, automation of tasks through smart contracts, also relevant interfaces for the exchange and interoperability with external solutions e.g. IoT and AI , improving scalability and providing security levels addressing new cyber threats, addressing potential use cases like digital product passport within the circular economy, tracking of digital records and associated rights or other IoT use cases. Through the European Blockchain PCP call for tender around 7 contractors, which may include consortia, will be funded progressively in three different phases of 3, 6 and 12 months. The first phase launched in April/May 2021.

5.2 Standardization

5.2.1 European ICT Standardization

There are a number of ongoing individual as well as joint efforts and programs to bring innovative solutions and research results related to distributed ledger technologies and blockchain into standardization activities of the major and relevant standardization organizations. The following clauses highlight a few research and standardization support and coordination activities bringing together the relevant research and standardization communities.

A description of the related SDOs and their scope of work can be found in ETSI GR PDL 001 [i.1] Landscape of Standards and Technologies.

The European Union Regulation (1025/2012) [i.4], adopted by the European Parliament and by the Council of the EU, established the current legal framework for standardization. It entered into force on 1 January 2013. The three European Standardization Organizations, CEN, CENELEC and ETSI are officially recognized as the competent authorities in the area of voluntary technical standardization, including ICT.

ETSI GR PDL 001 [i.1] provides some overview of various standardization activities. Regarding all activities in ETSI, the annual report [i.4] covers past results to end of 2019 and the ETSI work programme 2020-21 gives an overview of ongoing an upcoming activities.

5.2.2 Blockchain Standardization

Within ETSI, the key group for distributed ledger technology is ISG PDL (source of the present document).

Within CEN/CENELEC, the key group is CEN/CLC/JTC 19 for Blockchain and Distributed Ledger Technologies.

There are several activities of the EC to monitor and promote distributed ledger standardization, for example:

- EU Blockchain Observatory and Forum https://www.eublockchainforum.eu.
- European Blockchain Partnership https://digital-strategy.ec.europa.eu/en/policies/blockchain-partnership.
- EC Roundtable ICT Vertical and Horizontal Projects for Blockchain Standardization.
- StandICT.eu EU Observatory for ICT Standardisation (EUOS), TWG BLOCK https://www.standict.eu/discussion-groups/twg-block-blockchain/302.

5.2.3 EC Rolling Plan 2021 for ICT Standardization

Standardization is a means, not an end. In particular, standards are an essential component of European policies for the digital transformation. The EC publishes annually, in collaboration with stakeholders and standardization bodies, a "Rolling Plan" review of standards areas which are relevant to current policies and that identifies where possible gaps where further work would be advisable [i.5]. In particular, the Rolling Plan 2021 contains a special five-page section "Blockchain and distributed ledger technologies" which concludes with a list of eight requested actions.

Particularly relevant for the ISG PDL work are Actions 5 and 6:

- ACTION 5: Standardization of the operation and reference implementation of permissioned distributed ledgers and distributed applications, with the purpose of creating an open ecosystem of industrial interoperable solutions.
- ACTION 6: Standards Development Organizations active in blockchain/DLT standardization to liaise and coordinate to take advantage of synergies and maximize resources, including with relevant public and private partnerships.

Additionally, the following points are clearly within the scope of ISG PDL:

- ACTION 1: The standardization community should continue analysing possible standardization gaps and reflect on best way to fill them. [...]

- ACTION 3: Continue identifying use cases which are relevant for EU (including EU regulatory requirements like from GDPR, ePrivacy, eIDAS, TOOP, etc.) and submit them to relevant standardization bodies, including CEN-CENELEC and ETSI, and also ISO, ITU.
- ACTION 7: A general framework for Governance of the European networks based on DLT should be developed to allow the flow of smart contracts between different networks.
- ACTION 8: ESOs to develop the standards needed for the introduction of a programmable Euro (CBDC) and token economy (upcoming MiCA Regulation), in particular to ensure interoperability with smart-contracts, legacy systems, etc.

6 PDL related Research and Innovation Activities

6.1 Introduction

In this clause an overview of public research and innovation programmes and grants related to BDLT/PDL research topics and related thematic priorities and challenges is provided. Starting from an European level with the Horizon 2020 Research Programme and the Horizon 2020 Work Programme 2018-2020, Information and Communication Technologies [i.6], is analysed with respect to research topics and programme objectives related to PDL application domains.

The focus of the following clauses is then on selected national research and innovation funding programmes and projects related to BDLT/PDL; in particular there is an overview on recent as well as upcoming BDLT related public national research programmes and investments in the US; UK, Germany, and Spain.

Readers should be aware that no overview remains current very long and this clause can only provide a partial insight.

6.2 Horizon 2020 Projects related to DLT and Blockchain

A comprehensive list of EU Horizon 2020 Projects related to DLT and blockchain can be found in the Annex A, Table A.1 of the present document. The information on the projects in this table has been retrieved from the CORDIS data base. The majority of the projects is funded under the Research and Innovation Action (RIA) schemes, followed by the Small- and Medium-sized Enterprise (SME) instrument funding schemes, then by the Innovation Action (IA) schemes and finally the Coordination and Support Action (CSA) funding schemes. This is illustrated in Figure 6.1 below, where the left figure shows the distribution of all the projects listed in annex A, Table A.1 and the right figure shows DLT related grants under the MSCA and ERC funding scheme.

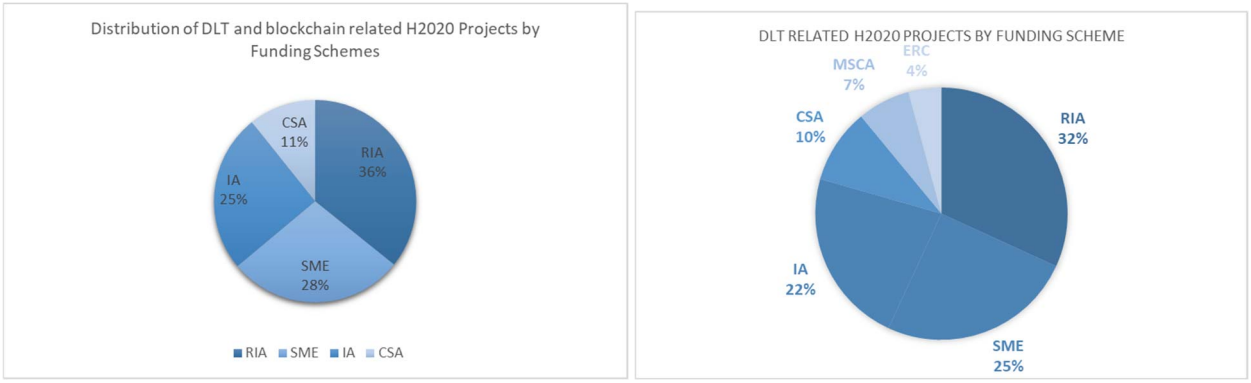

Figure 6.1: BDLT related projects by funding scheme

The PDL Application Domain or Field of Research of the Horizon 2020 projects related to blockchain and DLT is distributed as shown in the Figure 6.2, which shows the distribution of all the projects listed in Table A.1.