TRUSTS
Trusted Secure Data Sharing Space

D7.10 ‘Innovation Impact Assurance II’

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TRUSTS Trusted Secure Data Sharing Space

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Glossary of terms and abbreviations

Abbreviation / Term	Description
AI	Artificial Intelligence
AML	Anti-Money Laundering
API	Application Programming Interfaces
B2B	Business-to-Business
DAO	Decentralized autonomous organization
DataNFT	Data non-fungible token
DIO	Data Intelligence Offensive
DMA	Data Market Austria
EC	European Commission
EOSC	European Open Science Cloud
EU	European Union
EU27	27 European Union Countries

Abbreviation / Term	Description
FhG	Fraunhofer Gesellschaft
FFG	Forschungsförderungs-Gesellschaft (National Funding Agency Austria)
GA	Grant Agreement
GAIA-X	Pan-European initiative aiming to develop common requirements for a European data infrastructure
IDS	International Data Space
IDSA	International Data Spaces Association
IIA	Innovation Impact Assurance
IPR	Intellectual Property Rights
IT	Information Technology
NIS / NIS-2	EU Directive(s) on security of network and information systems
OpCo	Operating Company
ParIS	Participant Information System
PM	Project Management
PoC	Proof of Concept
QM	Quality Management
R&D	Research & Development
SME	Small and Medium-sized Enterprises
TRUSTS	Trusted Secure Data Sharing Space
UC	Use Case
USP	Unique Selling Proposition
T(s)	Task(s), also Work Tasks. Sub-unit of Work Packages
WP(s)	Work Package(s)

Referenced Sources

Jim Highsmith. "Agile Project Management: Creating Innovative Products". Pearson Education/Addison-Wesley. March 2004. ISBN 0-321-21977-5

Kent Beck; James Grenning; Robert C. Martin; Mike Beedle; Jim Highsmith; Steve Mellor; Arie van Bennekum; Andrew Hunt; Ken Schwaber; Alistair Cockburn; Ron Jeffries; Jeff Sutherland; Ward Cunningham; Jon Kern; Dave Thomas; Martin Fowler; Brian Marick (2001). "Manifesto for Agile Software Development". Agile Alliance. Retrieved 14 June 2010.

Executive Summary

Aspiration of this European Union (EU) funded programme is to bridge from research to market, that is to move beyond (research & development) output to outcomes and defined impacts. Thus, research findings, concepts and prototypes shall be usable for the next level of development and adoption by pertinent (industry) players in the wider business ecosystem. To enable this, Task 7.6 worked with all work packages (WPs) and tasks to both ascertain from the outset and throughout the project that the aspired Outcomes and Impacts are kept in mind and guide Output creation.

Our experience from the Data Market Austria (DMA) showed that this dramatically improves research transferability and hence business viability, whilst it also reduces efforts for conceptualization or technology development. Thus, continuous interactions with all WPs and tasks through regular check-ins, coordinated with project management (WP1) were of paramount importance. In doing so, we also complemented and enriched WP1 by enabling a firmer content-involved challenger role of project management as compared to a more coordinated role.

Agreed deliverable of T7.6 were continuous interactions with all WPs and Tasks, acting as a cross-function to the program to ascertain and optimize innovation impact. The activity report at hand "Innovation Impact Assurance II" at hand summarizes these activities, extending on the preceding interim report (M18).

TRUSTS views Innovation Impact Assurance (IIA) as the continuous process of optimizing project delivery and outputs towards aspired project outcomes and innovation impacts. IIA was delivered collaboratively between project quality management and targeted activities & interventions, as per the related methodology and approach (Chapter 2).

Whereas all parts of the TRUSTS project were addressed (Chapter 4.1), based on an analysis of projects mandates and call topics and other expected substantial impact (Chapter 3.1), prioritized areas for dedicated IIA support were identified (3.2) and corresponding, dedicated support activities and interventions were delivered (Chapter 4.2).

The IIA focus during the TRUSTS project was on the supporting the overarching mandates (objectives) of TRUSTS and corresponding roles to be fulfilled by TRUSTS as a platform, effecting:

1. Support for European data market requirements elicitation and business-technology alignment.
2. Evangelism for data market federation to align all consortium partner to this a core objective of TRUSTS.
3. Facilitation of development of concepts supporting business sustainability, through strengthening of the linkage and synergies between tasks T2.1 (European data market study), T7.1 (Sustainable Business Models, and T7.5 (Commercialization), as well as dialogue with market participants and multiplicators to ease ecosystem design.

Facing adverse starting conditions, the project achieved good progress towards fulfilling the project mandate. T7.6 in conjunction with project quality management has been providing a meaningful contribution to this.

However, whilst outside the scope of the Description of Action (DoA), our aspirational pursuit of co-establishing and / or attracting of a commercial and technical operator (OpCo) of the TRUSTS platform for seamless transfer of the platform into commercial operations failed.

1 Introduction

The objectives of WP7, which envelops T7.6 IIA were to develop a feasible business model to sustain the results of the project, mobilize an ecosystem, and conduct concrete actions for commercializing the data market platform. Thus, the WP conducted market research on what business models for data markets exist around the world. The focus was on business models combining scientific and non-scientific founders since TRUSTS had the same mixed private and public owned structure. The main deliverables during the project were on the ecosystem and its needs regarding the innovation aspects and intellectual property (IPR) and data management. The WP pursued to establish pre-conditions for successful business models and best practises.

The mandate of the specific T7.6 IIA was to deliver continuous interactions with all WPs and tasks, acting as a cross-function to the program to ascertain and optimize innovation impact.

This report summarizes the ongoing action related to "IIA" in the TRUSTS project as per T7.6. Other than the bulk of project-related reports in the TRUSTS projects, this paper by its nature is focused on reporting of activities supporting, rather than outlining R&D findings, novel concepts, and project outputs.

The purpose of this section is to give a comprehensive overview of the objectives set forth in the specific Deliverable, how they align and contribute to the success of the overall project, and the methodology employed to accomplish these goals. The aim is to provide a clear understanding of the direction and purpose of the Deliverable, and how it ties in with the larger project objectives. By presenting the objectives and approach in a coherent and concise manner, it enables stakeholders to grasp the significance of the Deliverable and its impact on the success of the overall project. The objective of this section is to provide a comprehensive picture of the goals, alignment, and methodology of the specific Deliverable, thereby contributing to the transparency and success of the project as a whole.

1.1 Mapping of Project Outputs

Purpose of this section is to map TRUSTS GA commitments, both within the formal Deliverable and Task description, against the project's respective outputs and work performed.

Table 1: Adherence to TRUSTS GA Deliverable & Tasks Descriptions

TRUSTS Task		Respective Chapter(s)	Justification
T7.6	Aspiration of this EU funded programme is to bridge from research to market, that is to move beyond (research) output to outcomes and defined impacts. Thus, research findings, concepts and prototypes shall be usable for the next level of development and adoption by pertinent (industry) players in the wider business ecosystem. To enable this, task T7.6 shall work with all work packages and tasks to both ascertain from the outset and throughout the project that the aspired Outcomes and Impacts are kept in mind and guide Output creation. Our experience from the Data Market Austria shows that this dramatically improves research transferability and hence business viability, whilst it also reduces efforts for conceptualization or technology development. Thus, continuous interactions with all work packages and tasks through regular check-ins, coordinated with project management (work package WP1) are of paramount importance. In doing so, T7.6 also complements and enriches work package WP1 by enabling a firmer content-involved challenger role of project management as compared to a more coordinated role.	*Chapters 2* *Chapter 3* *Chapter 4*	*Methodology* *Focus areas for interactions/ agile interventions* *Delivery during M1-M36*

1.2 Deliverable Overview and Report Structure

IA is meant as an instrument linking the project's activities and focussing them on aspired innovation to be delivered within TRUSTS.

Following the introduction, the report is divided into four main sections:

1. In (Chapter 2), the overall methodology and approach to IIA are described.
2. In (Chapter 3), the prioritized areas for IIA are described.
3. In (Chapter 4), delivered IIA activities are reported.
4. In (Chapter 5) provides a critical assessment of efforts.

First, the section on Methodology and Approach (Chapter 2) elaborates on the concept of involved & agile project management effecting a contextually evolving string of targeted interventions as complement to traditional, structured project management quality management, both supporting IIA.

Continuing, the section on Innovation Impact Assurance (IIA) critical to for the project's success (Chapter 3), elaborates on the aspired innovation impact, and related, prioritized areas for targeted in-project IIA activities and interventions. This includes assessment of each area.

Next, Chapter 4 reports on the delivered IIA activities. Once more, the synergistic duality between continuous activities arising from traditional project management quality management and agile interventions is upheld, whereby activities pertaining to the latter are grouped into Project-wide activities and WP specific activities, that ultimately deliver bilateral ideation, co-ordination, and project-wide alignment.

The report concludes with (Chapter 5), providing a brief critical review summarizing results of IIA activities.

2 Methodology and approach

The field of project management encompasses a variety of concepts, frameworks, methodologies, and tools, particularly in quality management and Innovation Impact Assurance (IIA). In the TRUSTS project, project management is understood as a continuum between administrative and agile approaches. Innovation Impact Assurance is viewed as a continuous process of optimizing project delivery and outputs towards desired outcomes and impacts. Administrative project management, also known as waterfall or sequential-plan-based, is well established and suited for small, repeatable, and physical projects. However, it faces challenges in medium-to-large projects, research & innovation projects, and digital projects.

2.1 Overview

In the realm of project management, there are numerous concepts, frameworks, methodologies, and tools related to quality management and Innovation Impact Assurance (IIA). In the context of the TRUSTS project, project management is perceived to occur along a spectrum between two prototypical approaches: administrative Project Management and agile Project Management.

Regarding IIA, it is considered as a continual process of enhancing the delivery and outputs of a project to align with desired project outcomes and innovation impacts.

Administrative (also: waterfall or sequential-plan-based) project management utilizes an extensive, well established and understood body of knowledge, effecting clarity in its mechanics. It is particularly suited for:

- Small projects, due to lower time-bound probability of change during the project duration
- Repeatable projects, due to available experience from prior manifestations, and clarity around a known end goal
- Physical projects, due to utilization of a comprehensive architecture as input-function to the project

However, it faces challenges when applied to:

- Medium-to-large sized projects, due to elevated time-bound probability of changes over the course of implementation
- Research & innovation projects, due to uncertainty of findings along the projects necessitating changes to the project path and / or the project output, and trade-offs vis-à-vis aspired project outcomes and impacts
- Digital projects, due to increased probability to changes to the underlying architecture and targeted functionality vis-à-vis insights from continuous market testing

Agile Project Management[1], on the other hand, attempts to address project management utilizing elements of the agile software development methodology. New challenges in product development require adaptive, not anticipatory, project management. Basic agile values are proclaimed in the Agile Manifesto[2]:

[1] Jim Highsmith. "Agile Project Management: Creating Innovative Products". Pearson Education/Addison-Wesley. March 2004. ISBN 0-321-21977-5

[2] Kent Beck; James Grenning; Robert C. Martin; Mike Beedle; Jim Highsmith; Steve Mellor; Arie van Bennekum; Andrew Hunt; Ken Schwaber; Alistair Cockburn; Ron Jeffries; Jeff Sutherland; Ward Cunningham; Jon Kern; Dave Thomas; Martin Fowler; Brian Marick (2001). "Manifesto for Agile Software Development". Agile Alliance. Retrieved 14 June 2010.

1. Individuals and interactions over processes and tools
2. Working software over comprehensive documentation
3. Customer collaboration over contract negotiation
4. Responding to change over following a plan

Agile project management is particularly suited for:

- Medium-to-large sized projects, due to the time-bound elevated probability of changes to the project scope
- Research & innovation projects, due to uncertainty regards path and achievable optimal output end-goal vis-à-vis defined project outcome and impact
- Digital projects, due to require adaptions to the underlying architecture and targeted functionality during project delivery

However, it faces methodological challenges arising from:

- Requirements for immediate or near-term changes, due constraints to applicability and infusion of change requests during sprints
- Limited employee involvement, due to elevated interaction requirements with the principal, such as a product owner, who is an inherent part of the project team
- Higher overhead, due to highly frequent (in software development, typically: daily) meetings and recurring, longer planning sessions

The governance framework and structure for Horizon2020 poses specific challenges to innovation impact assurance as part of wider project management in Innovation Action projects. The elongated duration between program design, sign-off, publication, proposal stage, project selection, and project delivery effects a high probability of changes in the state of R&D and the market environment facing any project. Key assumptions may see loss of validity by the time of onset and during delivery of projects. And whereas there is a clearly defined process for change requests, its applicability is for exceptional cases, and day-to-day involvement of the principal for ad-hoc guidance is not foreseen. This is a necessary trade-off to the behemoth task of managing such a vast program and the ability to assert control for project delivery along pre-set milestones, utilizing target objectives, outputs, and impacts. Thus, projects can benefit from following an overall waterfall model corresponding to the project governance structure, whilst complementing it with agile or similar approach elements, e.g., in work packages dealing with software development, to obtain the necessary flexibility vs. a changing environment.

Within TRUSTS, T7.6 was conceptualized and implemented to complement the overall administrative project management provided through WP1 of the project, thus enabling the required ambidexterity. It combines the project's quality management approach with targeted, continuous interventions necessitated over the course of the project.

2.2 Project Management (PM) Quality Management Approach

To ensure a high innovation impact, the role of project management was of high importance, as it provided the basis to ensure that all objectives were met, and high-quality results were delivered timely and in scope of the budget. Furthermore, it was part of project management to set up the overall framework in which the Consortium operates in. This included, among many other tasks, to set up bodies, procedures and tools that ensured proper oversight and good collaboration between WPs, the partners of the Consortium as well as other stakeholders. To translate research findings, concepts and prototypes developed within TRUSTS into usable and adoptable products and services, it was seen of high importance to have appropriate internal structures and processes in place.

The Project Management WP served this objective and ensured that project results were delivered timely, successfully, and impactful in compliance with European Commission (EC) regulations and the H2020 framework. The hands-on and continuous monitoring of the execution and completion of the project's tasks, activities, milestones, and deliverables safeguarded the qualitative and timely development according to the DoA and the project's work-plan. It furthermore ensured the successful, smooth, and efficient collaboration among the Consortium partners. Many of the activities of the project management work package focussed on providing guidance and direction on how to achieve tasks and the overall goals of the TRUSTS project, on ensuring and encouraging continuous and proactive communication with and between the consortium partners, on establishing transparency at all levels, on setting up proper report structures, and on conducting quality assurance as well as risk analysis and risk mitigation. To achieve all this, defined roles were assigned and appropriate mechanisms were set up that benefitted the IIA in several ways as outlined in table 2.

Table 2: Project Management Contributions to Innovation Impact Assurance

Project Management Roles, Formats of Exchange, Processes & Bodies	
Roles	
Role	**Contribution to Innovation Impact**
Scientific Lead	Making sure that scientific contributions inform the project in terms of e.g. exploring the status quo of data markets and data sharing technology, assessment of functional requirements, analysis of challenges and current trends and good research practices are in place.
Technical Lead	Ensuring the implementation of the technical vision especially in terms of architectural design and architectural alignment between work packages.
Security Lead	Ensuring the security and trustworthiness of the platform.
Legal & Ethical Lead	Ensuring that partners are well informed on European laws, regulations and ethical requirements that are relevant for the implementation of the TRUSTS platform, such as GDPR lawful basis and regulations.

Communication & Community Lead	Raising awareness about TRUSTS through dedicated dissemination strategies and building a community which engages with TRUSTS and provides valuable feedback & guidance.
Business Exploitation Lead	Ensuring the proper development of a feasible business model to sustain the results of the project, mobilise an ecosystem and conduct concrete actions for commercialisation.
Innovation Lead	Ensuring that technical characteristics of the platform meet market needs.
Formats of Exchange	
Format of Exchange	**Contribution to Innovation Impact**
Executive Board Telco organised by WP1 (Project Management WP)	Monthly call that provides oversight and an update of each WP. It gives participants the opportunity to learn about the progress, status quo, and challenges of each WP.
Plenary	Deep Dive into the project in which partners discuss the progress and proactively work on solutions for current challenges, taking place ~ every 6 months.
WP-level telcos	Organised by WP Leads at weekly, bi-weekly and monthly rate, focusing on WP specific challenges.
Domain-specific telcos	Organised by domain leads to coordinate all activities within a domain, where these span across WPs, e.g., regular joint telcos arranged by the Technical Lead for the technical community (WPs 3, 4, 5) under coordination of task T2.4
Task forces	Organised as temporary overlays, e.g., for the creation of platform demonstrators and mock-ups
Project Bodies	
Project Body	**Contribution to Innovation Impact**
Stakeholder Advisory Board (SAB)	Brings in external and independent expertise both in terms of technical and business needs, contributing to the results of the project, to its outreach and uptake
Project Management Board (PMB)	Allows to discuss high level challenges, risks and opportunities and propose strategies, decisions, and changes whenever necessary to address these.

The roles, formats, and bodies outlined in Table 2, benefitted the project in multiple ways. Contributions on the IIA are described in more detail in the following chapters.

2.2.1 Roles within TRUSTS

The Lead roles of the project are responsible to guide the vision of the project within their respective domain. As outlined in Table 2 these roles include:

- Scientific Lead
- Technical Lead
- Security Lead
- Legal & Ethical Lead
- Communication & Community Lead
- Business Exploitation Lead
- Innovation Lead

The Scientific, Security and Technical Lead were responsible for the scientific, security and technical vision and guidance for the project. They monitor the progress in these areas especially regarding the integration of the innovative technology as well as the services and functions of the platform. The **Scientific Lead** ensured that research activities remain in focus and cover the ICT 13-2018-2019 call's specific challenges and objectives and good research practises were in place and executed accordingly. In terms of the Innovation Impact the scientific domain informed the project on recent trends, challenges, and opportunities in the data market. The output included scientific publications on the one hand and deliverables on the other. Some of the research outputs can be accessed on the TRUSTS website and include papers on reasons for the failure of data markets, the robustness of meta market factorization against strict privacy constraints and challenges of (de-) anonymisation in data sharing. In terms of deliverables, the outcomes of WP2 are especially noteworthy as they provide specific insights on IIA, EU and worldwide data market trends, industry specific requirements, market functionality and architecture design and specification. ***These outcomes are particularly valuable as they provided direction for the project in terms of the development of an innovative platform that genuinely provides a unique contribution to the data market domain and society.***

The **Technical Lead** utilized the insights of WP2 and other WPs to translate them into an applicable and usable platform. Tasks included the architecture design, coordination of architectural alignment between WPs 3, 4 and 5 as well as project management and oversight to execute WP3. In this respect, the **Security Lead** was responsible to ensure that data protection principles, GDPR compliance and other security and privacy concerns were taken into consideration and properly implemented. This in turn was partly informed by the Legal & **Ethical Lead** whose main responsibility was to develop a robust legal and ethical framework for the TRUSTS Platform to ensure sustainability and compliance with relevant laws, regulations, and ethical principles. To this end the work carried out in WP6 focussed on providing guidance on the implementation of relevant legal rules and ethical principles. ***The USP of the TRUSTS Platform is that it provides a secure and trustworthy data sharing space that fulfils the technical requirements based on market needs***. ***In this respect the roles of Technical, Security and Ethical Lead were of key importance.***

The **Communication & Community Lead** was responsible to raise awareness about TRUSTS and build a community which engages with TRUSTS. This included joint work with WP1, the coordinator and the Business & Exploitation Lead for example in promoting TRUSTS in key events or setting up the SAB. This was important to elicit external feedback and expertise on the work done as well as to generate interest for potential users for the platform. The **Business & Exploitation Lead** analysed the market and develops a sustainable business model and

plan (incl. products & service portfolio, clear SLAs, pricing, and billing etc.) for the TRUSTS Platform to pave the way to the successful commercialisation of the TRUSTS Platform. In conjunction with the Communication & Community Lead they interacted with a community of stakeholders (SMEs, start-ups, large enterprises, academics, public administration) around the aspired Data-Services Ecosystem, which would be sustainable beyond the funding period of the project. The **Innovation Lead** brought the technology and business side together and ensured that the implementation of both market and technical requirements were accomplished in alignment with each other. ***The Communication & Community Lead, the Business & Exploitation Lead as well as the Innovation Lead thereby oversaw and ensured that technology and business considerations were incorporated in alignment from the start of the development until the project end, easing the aspired transfer of the TRUSTS platform into commercial operation.***

These roles were identified by the coordinator at proposal writing stage as they provide special value and ensure that high quality results are achieved within their respective domain. To develop a truly unique and innovative platform which meets market needs, incorporates state of the art technology, and complies with laws, regulations, ethical and security requirements each of these roles were important. Having a dedicated role responsible for the success of the domain specific objectives ensures accountability, transparent workflows and improves the overall quality of results.

2.2.2 Formats of Exchange

Aside from bilateral and multilateral telcos there were special formats of exchange offered by the Project Management that allowed for alignment on a broader and consortium wide level. One of these formats was the **monthly Executive Board Telco**. The aim of this meeting was to get an update on the progress of each WP and to oversee the progress. On a project management level, it was an opportunity to identify challenges, provide guidance and direction when challenges occurred and to monitor the progress. In practice it also served as a tool of alignment between each partner allowing each work package lead to be informed on what happens in the other WPs. Therefore, requirements, action items and objectives that spanned across multiple WPs, sometimes in a way that could not be foreseen, were communicated. This allowed WPLs and Task Leads to consider the work of other WPs and Tasks in conjunction with their own work. The **plenary** was a second consortium wide Format which takes place every 6 months for two full days. Aside from presenting the progress on a WP level, the format focused on more practice-oriented work on current challenges and allowed partners to weigh in and provide their input on other WPs. This consortium wide alignment benefitted the quality of the overall work within the project as every WP had to consider how the work within other WPs affects their own work and progress. Furthermore, the coordinator actively encouraged WP specific telcos to focus on WP specific challenges. This included also technical telcos as technology is a core outcome of the project. ***As Innovation Impact Assurance is an explicit area of focus within WP7 and requires constant alignment between all partners involved, these formats are an important tool for assuring innovation impact.***

2.2.3 Project Bodies

There were multiple project bodies that benefitted the overall work of the consortium. Regarding IIA, the PMB and the SAB can be highlighted. The **PMB** was the ultimate decision-making body of the Consortium. One Delegate was appointed per Partner to vote at any meeting. The PMB took decisions on changes regarding the budget, Annex I of the GA or on changes in the composition of the Consortium. Other functions of the PMB are outlined in D1.1 (Project Management Plan). The PMB therefore allowed to discuss high level challenges, risks and opportunities and to propose strategies, decisions, and changes whenever necessary to address these. The Project Coordinator acted as chair of the PMB and the PMB is advised by the **SAB**. The SAB consisted of high level academic and industry experts who contributed to the results of the project, to its outreach and uptake. The WP Leads with co-leads as deputies secured proper representation of all WPs at all project meetings. Therefore, the SAB brought in external and independent expertise both in terms of technical and business needs, contributing to the results of the project, to its outreach and uptake. Both bodies contributed to the risk analysis and mitigation of the project, helped to identify opportunities and to steer the project in the right direction, with the PMB being the responsible body to undertake high-level decisions. ***While the PMB contributed to the Innovation Impact Assurance by ensuring the overall project success through strategic decisions, the SAB provided external expertise which benefitted the innovation impact on a strategic level as well, especially in terms of technical and commercial feasibility.***

2.3 Agile Interventions for Innovation Impact Assurance

Aspiration of this EU funded programme is to bridge from research to market, that is to move beyond (research & development) output to outcomes and defined impacts. Thus, research findings, concepts and prototypes shall be usable for the next level of development and adoption by pertinent (industry) players in the wider business ecosystem.

Experience from the DMA shows that this dramatically improves research transferability and hence business viability, whilst it also reduces efforts for conceptualization or technology development. Thus, continuous interactions with all WPs and tasks through regular check-ins, coordinated with project management (WP1) were of paramount importance. In doing so, T7.6 also complemented and enriched work package WP1 by enabling a firmer content-involved challenger role of project management as compared to a more coordinated role.

To enable IIA, T7.6, acting as a cross-function to the program, worked with all work packages and tasks to both ascertain from the outset and throughout the project that the aspired outcomes and impacts were kept in mind, and guided optimized Output creation. IIA was to ensure that the addressing of both market and technical requirements will be accomplished during the project, while enabling the successful implementation of appropriate novel concepts, so that innovative products, services, and processes would arise from the project's output ensuring thus its sustainable update beyond its duration.

Based on the identification of the most critical areas for innovation impact as described in Chapter 3 and arising from continuous assessment of the evolving project situation, targeted, agile interventions were pursued, as described in Chapter 4.

3 Key IIA Considerations for Achieved Project Success

The main objective of this section is to describe the topics identified as critical to IIA during the project. Identified topics were used to guide identification and delivery of required quality assurance and targeted IIA interventions during months 1-36 of the project.

3.1 Aspired Project Innovation Impact

The aspired project innovation impact can be attributed to two layers:

I. Overarching mandates (objectives) of TRUSTS and corresponding roles to be fulfilled by TRUST as a platform.
II. Call topics and other expected substantial impacts.

Overarching objectives of TRUSTS, as per delivery until the end of the project, and corresponding project outputs can be summarized as:

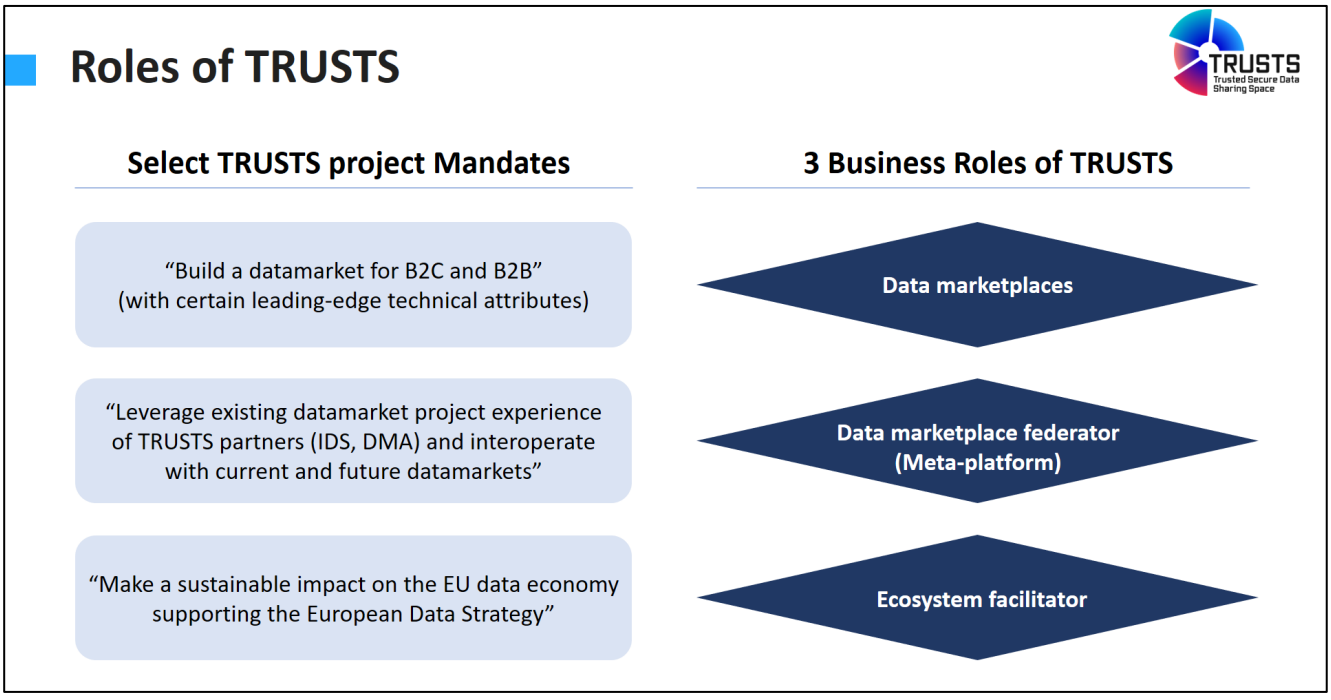
Mandate 1 (M1): Setting up a fully operational European Data Marketplace, with a focus on data security, data sovereignty, and enabled data service interoperability.

Mandate 2 (O2): Creation of a platform federation that allows the integration and adoption of current and future platforms.

Mandate 3 (O3): Developing the go-to-market approach to make it sustainable beyond the project finalization.

… then can be used to further derive the techno-commercial roles to be fulfilled by TRUSTS as a platform:

Figure 1 The Roles of the TRUSTS project in the EU data economy



Call topics and other expected substantial impacts of the TRUSTS project encompass:

Table 3: Call topics and other expected substantial impact

Call Topic Expected Impact 1
"Personal data protection is improved, and compliance with the General Data Protection Regulation (and other relevant legislation) is made easier for economic operators."
What the project delivers (GA)
- TRUSTS delivers scalable technology to enable computing without sharing personal data. - Concrete and actionable set of legal/ethical guidelines for all actors involved at different levels of the digital value chain
Path to achieve the Impact (WP3, WP4, WP6)
- Multi-party computation technology, data protection by design and by default principle is followed, anonymisation / de-anonymisation tools and smart contracts are developed.
Call Topic Expected Impact 2
"Citizens' trust is improved as privacy-aware transparency and control features are increasingly streamlined across data platforms and Big Data applications."
What the project delivers (GA)
- Legal and ethical guidance ensuring that citizens' information, control and consent are respected - Technologies that enable companies to guarantee new levels of privacy to their end-users
Path to achieve the Impact (WP3, WP4, WP6, WP7)
- Close dialogue between technical and legal and ethical partners will ensure a complementary approach, where both further the goals of the other. - Transparency in business models reduce the perception of 'hidden objectives' - Enablement of standardized 'smart contracts'
Call Topic Expected Impact 3
"Better value-creation from personal and proprietary/industrial data."
What the project delivers (GA)
- Measurable increase in income of use-case partners NOVA (Operator data) and PB (Bank data)
Path to achieve the Impact (WP5, WP7, WP8)
- Concrete and well-defined use-cases ensure that technology innovations in WP3 and WP4, are effectively adopted in WP5. - Business model innovation extrapolated from the use-cases in WP7, together with communication activities in WP8 ensure that impact is extended beyond TRUSTS

Call Topic Expected Impact 4
"20% annual increase in the number of data provider organisations in the personal and industrial data platforms. 30% annual increase in the number of data user/buyer organisations using industrial data platforms. 50% annual increase in number of users (data subjects) in the personal data platforms."
What the project delivers (GA)
- A federated technology platform that brings together other European data markets and creates the technical prerequisites for including future data markets - Dockerized versions of the technology components developed in the project, deployable on TRUSTS, as well as on DMA and in IDSA - New business models
Path to achieve the Impact (WP5, WP7, WP8)
- Leveraging existing platforms, TRUSTS will be able to break the typical problems of multi-sided business models, where insufficient offer dissuades customers and lack of customers reduces the offer. Concretely, each of the three use-cases has provided measurable KPIs to quantify these percentual changes.
Other Substantial Expected Impact (i)
"Appropriate consideration and attention towards an ethically sound approach to big data processing, and effective involvement of the relevant actors and stakeholders."
What the project delivers (GA)
- Clear delineation of the right not to be subject to automated decision-making, specific guidelines towards trustworthy AI and big data analytics
Path to achieve the Impact (WP6)
- Intra-disciplinary literature study and close collaboration between legal, ethical and technical partners
Other Substantial Expected Impact (ii)
Improving the confidence of citizens towards Big Data technologies and data markets. Creating a trust environment for data transactions. Protecting fundamental rights of citizens."
Relationships between project results & expected impact
- Communication and engagement of the end-users, including summaries for citizens
Path to achieve the Impact (WP4, WP6, WP8)
- Study the key elements that influence user-perception of big-data technologies, and jointly address these key elements in a coherent communication strategy - Raise awareness about trust for data transactions in the EU, stimulate data sharing through the reglementary developments.

Other Substantial Expected Impact (iii)
"Improved confidence and satisfaction of data subjects by the end of 2020."
What the project delivers (GA)
- By the end of 2020 TRUSTs will be in M12 and first prototypes of technology components and non-technology tools would already have been made available to the use-case partners.
Path to achieve the Impact (WP4, WP6, WP8)
- Surveys will measure the perception and satisfaction of end-users with the practices of telecom operators and banks.
Other Substantial Expected Impact (iv)
"Substantial improvements towards creating a secure environment for data access, process and analysis, demonstrated in the use situations that arise in the data experimentation /integration projects."
What the project delivers (GA)
- Ready-to-use software libraries providing access to privacy preserving tools.
Path to achieve the Impact (WP4, WP5, WP6)
- Secure protocols developed during the project will be implemented for easy integration by use-case partners and demonstrated in the three use-cases described in this proposal - Analysis is being provided of cybersecurity related legal issues such as security of data processing, data breaches, data incidents and cyber-attacks handling.
Other Substantial Expected Impact (v)
"Protection by design"
What the project delivers (GA)
- Infrastructure setup and privacy preserving components are tightly integrated
Path to achieve the Impact (WP3, WP4)
- All protocols will be designed with privacy/confidentiality of data as the primary goal.

3.2 Prioritized areas for dedicated Innovation Impact Assurance support

Task 7.6 was set up to provide IIA across the project, whilst focusing its limited resources on the areas of highest impact.

A review of the call topics expected impact and expected other substantial expected impacts revealed that these items are either time-distant impacts which will manifest themselves in interaction with the evolving European data economy, whereby they cannot be attributed discretely to the project itself (expected call topics impact) or are tactically linked to planned project delivery in specific WPs and Tasks (other substantial expected impact).

At the same time, it must be considered that the original proposal and project plan was based on an ultimately not materialized core assumption: at the start of the TRUSTS project, the Consortium would be able to build on and collaborate with two fully functional, by then established data markets with a proven business model (DMA, IDSA). This would have provided an immediate boost and enable streamlined delivery towards all three identified project mandates (objectives):

1. European data market geared towards data security, data sovereignty, and enabled data service interoperability: utilizing readily available, mature infrastructure asset of the DMA and the standards-based open architecture of IDSA.
2. Federation and integration with other platforms: working with the DMA operator and IDSA to prototype and test data market federation, possibly even effecting willing amendments to their respective data market components.
3. Business sustainability and ecosystem facilitation: building on proven business models, enabling cross-fertilization of a budding TRUSTS ecosystems – creation of an ecosystem on its own is a vast, long term, resource intensive task – through enabled interoperability, thereby allowing to focus on ability to scale commercialize add-on value propositions / capabilities related to data security and data sovereignty.

However, upon start of the project, the DMA was not operational and re-usability of its artefact components proved to be limited. Equally, concrete implementations of the IDSA connector standard were not readily available for re-use.

Therefore, whilst providing general support for call topics expected impact and other substantial expected impact, dedicated IIA support activities and targeted interventions during project duration had to be focused on the overarching objectives of TRUSTS and corresponding roles to be fulfilled by TRUSTS as a platform, effecting:

1. Support for European data market requirements elicitation and business-technology alignment
2. Evangelism for data market federation to align all consortium partner to this a core objective of TRUSTS
3. Facilitation of development of concepts supporting business sustainability, through strengthening of the linkage and synergies between tasks T2.1 (European data market study), T7.1 (Sustainable Business Models, and T7.5 (Commercialization), as well as dialogue with market participants and multiplicators to ease ecosystem design

3.3 Enabling transfer of the TRUSTS data market platform to commercial operation

Beyond the formal objectives and requirements towards project delivery (outputs) and innovation specified in the DoA the TRUSTS project partners ultimately aspired to not just prepare and enable but to achieve transfer of the TRUSTS data market platform to commercial operation upon project end. Because achieving this would most sustainably create a higher innovation impact for the European data economy, beyond the project-domain specific technical (WPs 2, 3, 4, 5), regulatory (WP6), and business model & process innovation (WPs 2 and 7), and the communication and dissemination thereof (WP8 and T7.2).

Thus, expanding on the considerations of section 3.2, 6 questions were deemed critical to ascertaining a commercially operated TRUSTS data market and data market federator upon project end. Related IIA activities were delivered throughout the project, but with a peak of related efforts during the 2nd half the project:

1. How can TRUSTS mitigate a potential shortfall / resource crunch effected by the changed environment related to the DMA?
2. How can TRUSTS optimize the exploitation of R&D outputs around the defined three project use cases with respect to data trading as opposed to mere data exchange & transformation?
3. How can the project enable onwards-usability and monetization of created IP vis-à-vis future requirements for development, maintenance, and operations, respecting a balance interests of project partners and that of a platform operator?
4. How can the project co-establish and / or attract a future commercial and technical operator of the TRUSTS platform?
5. How can TRUSTS meaningfully and at scale attract early adopters, particularly data buyers and sellers, as well as data markets for federation, whilst the platform is under development and no operating company is in place?
6. How does TRUSTS contribute and link to artefacts and participants within the evolving European data economy, leverage and collaborate with concurrent national and pan-European initiatives and projects, and ascertain a meaningful and sustainable contribution in support of the European Data Strategy?

4 Delivered Innovation Impact Assurance Activities

The current chapter focuses on the Technical & Quality Assurance & Risk Assessment Plan (D1.5) and outlines the approach taken towards quality management during the TRUSTS project. The activities carried out encompass the definition of responsibilities with regards to quality assurance, implementation of effective measures for quality control, and definition of quality assurance and control measures. Additionally, the quality implementation strategy, which encompasses the definition of actions & decisions and change control procedures, is also discussed. Further, the collaboration infrastructure is defined and the setup of templates, including those for the European Commission (EC) deliverables, periodic reports, and financial statements, is outlined.

The use of PowerPoint presentations for internal and external purposes such as project meetings, reviews, and presentations during workshops, exhibitions, and conferences, as well as web-based documents for internal use such as agendas, minutes, and other contributions are also addressed. The aim of these activities is to ensure a high-quality delivery of results, meet project objectives and contribute to the innovation impact assurance.

4.1 Delivered PM Quality Management

The overall project delivered specific results in the form of deliverables as well as in technical, scientific, and conceptual achievements. To ensure innovation impact, a range of measures were taken, and processes were implemented to ensure the quality of the results.

4.1.1 Quality Approach

In terms of D1.5 (Technical & Quality Assurance & Risk Assessment Plan), the overall quality approach as well as quality methods have been outlined. The activities undertaken included:

- Definition of responsibilities in terms of quality assurance
- Implementation of effective measures for quality assurance control
- Defining quality assurance and control measures
- Setting up a quality implementation strategy including
  - Definition of actions & decisions
  - Definition of change control procedures
  - Definition and setup of the collaboration infrastructure
  - Definition of template and template structure as well as the setup of templates
    - Templates for the EC: deliverables, periodic reports, explanation of the use of resources and financial statements
    - PowerPoint presentations for internal and external use, e.g., for project meetings, reviews, presentations during workshops, exhibitions, conferences etc.
    - Web-based documents for internal use: e.g. agendas, minutes, other contributions etc.

Some of the outlined activities undertaken in terms of quality assurance, such as the definition of responsibilities, as outlined in Chapter 2.3.1 (Roles within TRUSTS), contribute directly to IIA. Others, such as setting up templates

and template structures or the setting up of a collaboration infrastructure contributed to IIA more indirectly but were nonetheless a helpful vehicle to ensure a high quality of results, meet objectives and drive success.

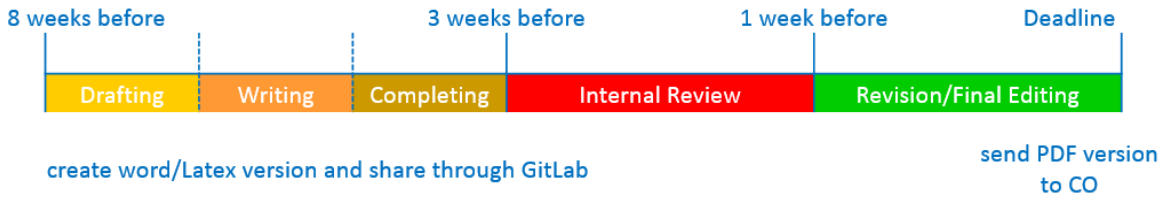
4.1.2 Quality Methods

Corresponding to the quality approach, D1.5 specified different quality methods. The activities undertaken in this area included:

- Set up of project plan and milestones, outlining interdependencies between WPs
- Setting up of deliverable overview, specification of reviewers for each deliverable and review process (see figure 2 with clearly outlined responsibilities and quality indicators
- Clearly defined quality indicators to track the quality within WPs
- Define responsibility and minimal requirements for dissemination activities
- Setup of Benchmarking Platform as per the international standards for software development and products

Similarly, some activities undertaken while establishing quality methods benefitted IIA directly while others contributed to it indirectly. The established review process for example, as showcased in figure 3 ensures for smooth collaboration and the timely delivery of results. As this was a technical project, there was a high interaction and relation between WPs. If one deliverable could not be delivered timely, this would have affected the work of other partners and deliverables as well, therefore the strict compliance with the outlined review process were of high importance, enabled partners to plan ahead and improved the quality of collaboration.

Figure 2: Internal QA and review process



Other activities such as the specification of the benchmarking platform directly contributed to IIA as well. As a core technical result, the benchmarking platform was central for the achievement of the project goals (e.g., development of benchmarks, challenges). As this refers to the international standards for software development and products it included quality indicators such as Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, Portability and thereby directly contributed to the innovation impact from a technical side.

4.1.3 Other Activities

Other activities undertaken included:

- Regular Executive Board Telcos
- Organisation of multiple Plenaries
- Regular Project Management Board Meetings

- Setting up of Stakeholder Advisory Board (SAB)
- Tracking and monitoring progress on a day-to-day basis as per the quality indicators defined

As outlined in Chapter 2.3.2 (Formats of Exchange) and 2.3.3 (Project Bodies), these activities mainly helped in the alignment between WPs and tasks, decision making, overall project strategy, acquiring of outside expertise and overseeing the overall progress and quality of results.

4.2 Delivered targeted IIA Activities and Interventions

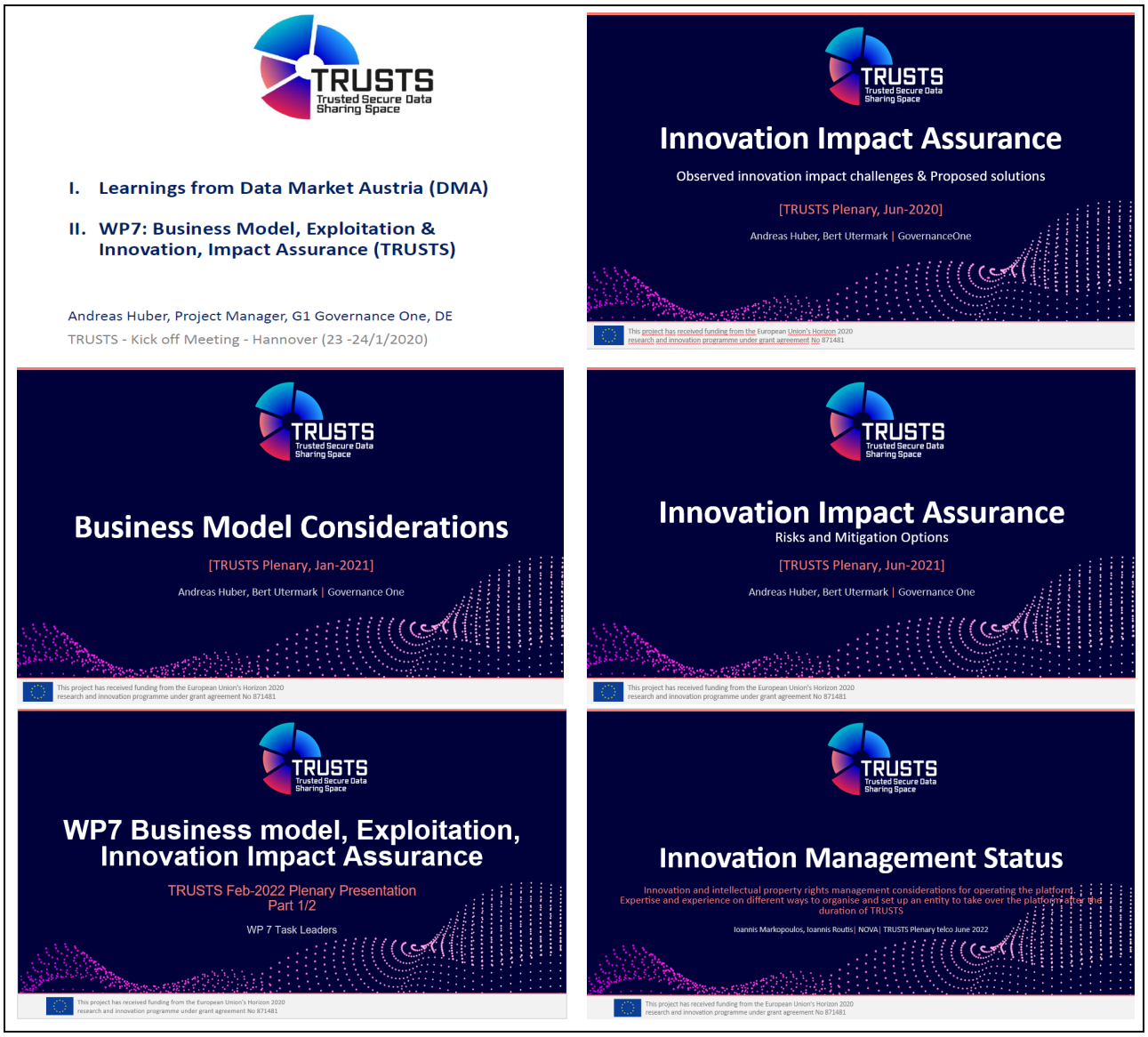
This section outlines activities of T7.6 aimed at supporting the requirements elicitation, business-technology alignment, and federation within the TRUSTS project. These activities included participation and contribution in the project's kick-off meeting, subsequent online project plenaries, discussions around business model considerations and arising requirements, and risk management. The objective of these activities were to align all consortium partners on the mandate of federation and provide a platform for discussing important project-related topics. The discussions aimed to address the potential risks and mitigation strategies for various challenges faced by the project, such as late establishment of a commercial platform operator and limited commercial scalability.

IIA activities supporting Requirements Elicitation, Business-technology Alignment and Federation (Chapter 4.2.1) were provided throughout the project, but with a focus on the first 18-24 months of the project. Activities supporting business sustainability and ecosystem design (Chapter 4.2.2) were delivered throughout, linking to Activities to facilitate the transfer of the TRUSTS data market platform to commercial operation (Chapter 4.2.3) which were a focus during the second half of the project.

4.2.1 Activities supporting Requirements Elicitation, Business-technology Alignment and Federation

- Participation and contribution to establish the project, highlighting experiences and lessons learned from the DMA project, particular to project governance and in-project alignment, and hurdles during project delivery
- Participation in, and contribution to all online project plenaries during project duration, alerting and aligning all consortia partners on the mandate of federation (platform interoperability and technical implementation of TRUSTS as a federator for other data markets), and providing a forum for discussion around a draft taxonomy
- Participation in, and contribution to online project plenaries, discussing business model considerations and arising requirements for the platform vis-à-vis business model considerations. Additionally, a guest contribution on a concrete infrastructure solution for data sharing spaces in the wider IDSA / FhG / GAIA-X environment got organized
- Participation in, and contribution to online and in-person project plenaries, alerting and aligning all consortia partners on risks and mitigation options for (1) late establishing of a commercial Platform Operator, (2) limited commercial scalability of differentiating capabilities, (3) marginal / slow uptake of associated data services, as well as infrastructure and integration services, and (4) lack of true federation ('market of markets'), enabling commercial transactions with data markets

Figure 3: Select TRUSTS Plenary Working Session delivered as part of task T7.6



- Organization of an All-Hands "Positioning of TRUSTS" workshop in month M10, creating deeper awareness for and alignment on the three roles of the TRUSTS platform (see figure 1). This included the discussion of prerequisites and characteristics pertaining to these roles, inherent challenges and complications principal options and corresponding implications
- Co-organization of a project-wide "Business Technology Alignment" workshop, acting as platform for alignment

Figure 4: Select TRUSTS Internal Alignment Working Session delivered as part of task T7.6

Additionally, Business Lead and Task Lead of T7.6 contributed:

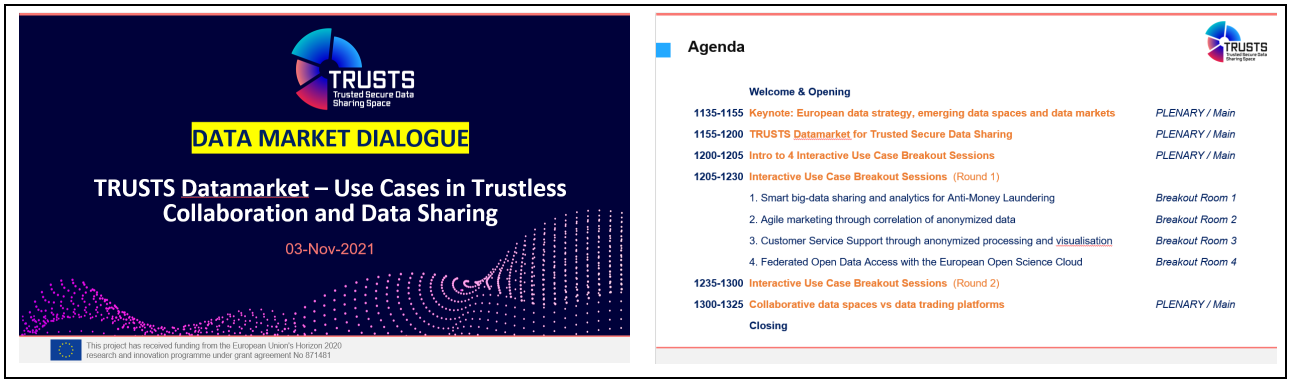
- Close coordination with the Technical Lead and regular participation in the weekly calls of task T2.4 "Architecture design and technical specifications", thereby tapping into the planning of the technical implementation in work package WP3
- Regular coordination and alignment with the project's Innovation Lead, who also acts as work package leader for WP2 and as conduit to the project use cases pursued in work package WP5
- Support for two project-wide workshops related developing a unified, business-centric data market and data market federation taxonomy by task T7.1, using these as a platform to align on requirements of the three main project objectives and derived techno-commercial roles of the TRUSTS platform
- Participation and contribution to monthly consortia calls, in a role as challenger focussing the discussion on prerequisites of achieving innovation impact, as per the mandate of task T7.6
- Participation and contribution to Management Board meetings, as per the project governance structure, as venue for discussing options, trade-offs and project decision making

4.2.2 Activities supporting business sustainability and ecosystem design

- Close coordination with, and direct support of task leader for T2.1 "EU and worldwide data market" in task planning and tactics ideation, thereby increasing project-relevance of market research and strengthening the linkage to task T7.1. This also effected a front-loading of task T2.1, in support of the interdependency flow between task T2.1 "EU and worldwide data market" -> task T7.1 "Sustainable business models" -> task T7.5 "Commercialization initiatives and action plan" vis-à-vis the sequence and timing of activities and project milestones
- Regular interaction with prior DMA consortia partners, and stakeholders of the Austrian data landscape, through DIO, soliciting inbound-leads of data-driven SMBs through co-delivery of DIO workshops, e.g. Spoton Statistics (www.spoton-stats.com) and nexyo (www.nexyo.io)
- Soliciting inbound-leads Delivery of TRUSTS knowledge dissemination and communication activities (webinars, podcasts and newsletter contributions) through work package WP8, soliciting inbound leads with data solution providers, e.g. CATCH.market (www.catch.direct) and Decentriq (www.decentriq.com), and with data initiatives, e.g. Data Occitanie (www.occitaniedata.fr)

- Support for, and close coordination with the task leader of task T3.3 "Interoperability Solutions" to jointly advocate data market federation and interoperability beyond mere demonstration of principal technical feasibility. This included conceptualization of survey of data market operators aimed at providing inputs to data market research for tasks T2.1, commercial aspects for tasks T7.1 and T7.5, and sentiment and technical prerequisites for federation and interoperability for task T3.3. Following a low response rate, a revised approach was pursued, soliciting direct stakeholder interactions through tasks 7.2 and work package WP8, and a data market registry was created in task T3.3.
- Close coordination with task T7.2 and work package WP8, aligning on and creating synergies between stakeholder engagement, community building and project communication.
- A highly visible online "Data Market Dialogue", i.e. a webinar with break-out sessions with potential future data market and data market federator users

Figure 5: Data Market Dialogue – Webinar and collaborative break-out sessions with potential data market / federator users



Online project plenary sessions listed under Chapter 4.2.1 also addressed aspects of business sustainability.

4.2.3 Activities enabling transfer of the TRUSTS data market platform to commercial operation

Beyond the formal objectives and requirements towards project delivery (outputs) and innovation specified in the DoA the TRUSTS project partners ultimately aspired to not just prepare and enable but see transfer of the TRUSTS data market platform to commercial operation upon project end. Because achieving this would most sustainably create a higher innovation impact for the European data economy, beyond the project-domain specific technical (WPs 2, 3, 4, 5), regulatory (WP6), and business model & process innovation (WPs 2 and 7), and the communication and dissemination thereof (WP8 and T7.2).

Thus, T7.6 collaboratively with all project consortium members set out to develop and implement answers to 6 questions we deemed critical to ascertaining a commercially operated TRUSTS data market and data market federator. Below, these questions are re-stated, along with highlighted key actions taken, and related outcomes:

1. ***How can TRUSTS mitigate a potential shortfall / resource crunch effected by the changed environment related to the DMA?***

- Upon project start of TRUSTS, the DMA was not transferred to further development and commercial operation. Project partner RSA conducted an extensive stock-taking and assessment of assets available from the DMA. Hence, re-usability of assets for the purpose of TRUSTS was also lower than anticipated.
- WP7 supported task T3.3 in its search to find external partners for conjoint development and testing in the field of data market federation. However, despite a public expert panel discussion & workshop, and reach out to numerous commercial Data Market Operators (DMO) based on a data base of DMOs, none expressed interest in collaborating on the topic of data market federation, the more so in the absence of absence of an operated data market as commercial counterparty.
- T7.1 and T7.5 conducted extensive secondary and primary research for identification and addressing of real-life challenges and emerging requirements of (potential) data market users in lieu of accessible DMA users and stakeholders. However, missing insights from the commercial operations of the DMA prevented an in-depth commercial and operational assessment for transferred learnings for TRUSTS.

2. ***How can TRUSTS optimize the exploitation of R&D outputs around the defined three project use cases with respect to data trading as opposed to mere data exchange & transformation?***

- WP7 sought close collaboration with the Business Lead, Innovation Lead and the project use case partners to identify pathways for scaling and commercializing project use-case related capabilities and value propositions. Their pursued commercialization pathway by the incumbent project partners got insulated and is independent from the (now materialized) risk of pending commercial operation of the TRUSTS data market upon end of project.
- Data trading, if any or if in part by barter, is not the main concern of the commercial clients and / or users of the services arising from the use cases. Any required commercial arrangement – e.g. 10 Financial Institutions sharing data for AML analysis – will not require trading services of a market but can use parts of the TRUSTS technology stack enabling secure and trustworthy exchange.

3. ***How can the project enable onwards-usability and monetization of created IP vis-à-vis future requirements for development, maintenance, and operations, respecting a balance interests of project partners and that of a platform operator?***

- Innovation Impact Assurance efforts informed the work of tasks T7.3 (IPR and Data Stewardship) and T7.5 (Commercialization) related to IPR management. Code and documentation will be made available in line with requirements towards Horizon 2020 Innovation Action projects.
- Absent an OpCo for TRUSTS, no requirements could be elicited and discussed by the project partners.

4. ***How can the project co-establish and / or attract a future commercial and technical operator of the TRUSTS platform?***

- Joint efforts were asserted by the Business Lead, Innovation Lead, and work package WP7 (Business Exploitation) to establish a mechanism for platform operations beyond the end of the project. WP7 also conducted multiple ideation sessions to transfer learnings from the DMA project regards recruitment of project partners for an OpCo. However, from within the consortium of TRUSTS project partners, no alliance as a nexus for a future (joint) TRUSTS OpCo could be formed.
- Project use case partner Nova indicated during Q1_2022 an interest to explore taking on a leading role in operating a future TRUSTS platform, contingent on evolution of its project use case, availability of Greek public co-funding for additional R&D and commercialization initiatives, 3rd parties' co-operation, NOVA's business priorities, and economic conditions. However, the exploration was abandoned due to adverse circumstances.
- T7.6. also explored in 2022 with project partner DIO the use and usability of the TRUSTS platform by the DIO members / within the Austrian data ecosystem, as the Austrian DMA did not materialize. However, as an non-profit organization, DIO itself is in no position to invest into required further R&D, commercialization and startup-operation. DIO's experimental test beds for its constituents participating in industry-domain or use-case specific data circles are focused on data exchange rather than trading.
- Identification of an external OpCo or Incubator / Investor would have required extensive efforts far outside project mandate / DoA and budget. Additionally, absence of an operational Minimal-viable-Product (MvP-II) TRUSTS data market, sufficiently before project end did not allow for any practical demonstration and marketing of the overall solution, and elicitation of beta user findings and requirements essential to inform any assessment or due diligence by an interested 3rd party.

5. ***How can TRUSTS meaningfully and at scale attract early adopters, particularly data buyers and sellers, as well as data markets for federation, whilst the platform is under development and no operating company is in place?***

- The project included 3 Use Cases that leveraged and built on capabilities of the TRUSTS platform. It was assumed that clusters of early platform adopters would thus form around the Use Cases. In foreseeable absence of a commercially operated TRUST data market platform, and a TRUSTS OpCo as legal counterparty, the Use Cases ultimately did not attract budding sub-ecosystems or early adopters to the TRUSTS platform (for detail on the field trials of each Use Cases, please see reports D5.5, D5.7, and D5.9). Use Case partners are autonomous in setting their strategic direction and safe-guarding their commercial interests, beyond the TRUSTS project. Accordingly, innovations and artefacts arising from the use cases will see exploitation outside a TRUSTS platform.
- During Q3'21-Q4-21, WP7 was in communication the project coordinator for the Horizon 2020 project "DMS Accelerator", Zabala (Spain), to explore utilization of a future TRUSTS datamarket as infrastructure / test bed for their pan-European portfolio of supported SMEs. However, an initial exploration yielded no result, due to the late stage of the DMS accelerator projects and the absence of an operational TRUSTS platform at the time.
- T7.6 provided dedicated support for tasks T3.3 (Interoperability and Federation), T7.1 (Business Model), T7.5 (Commercialization), in collaboration with WP8 (Communication and Knowledge Dissemination). E.g. webinars and panel discussions were organized to raise the profile of TRUSTS and generate awareness and interaction with external stakeholders.
- TRUSTS participated in the European Big Data Value Forum in Prague (EBDVF 2022) for a one-hour session to present the Future of Europe's Innovation using Federated Data Sharing Environments with the TRUSTS platform. A booth in the forum helped create space for dialogue with potential partners and a community that support TRUSTS and also to discuss with the external stakeholders the future needs of the data markets and how TRUSTS leverages those gaps by its current and future functionalities and services.
- The emerging economic downturn and deteriorating investment climate apparent since early 2022 additionally hindered interest of 3rd parties in collaborative development and experimentation at cost.

6. ***How does TRUSTS contribute and link to artefacts and participants within the evolving European data economy, leverage and collaborate with concurrent national and pan-European initiatives and projects, and ascertain a meaningful and sustainable contribution in support of the European Data Strategy?***

- Related activities, encompass interactions of individual project partners with their national data ecosystem stakeholders, participation of individual project partners in concurrent national and international R&D projects (e.g. SAFE-DEED), organization of international workshops or participation in international conferences pertaining to the data economy, regular project reporting, publication of project results and dedicated dissemination activities. They are being reported in detail, by WP8 "Dissemination, Communication & Community Building".

- The performance of each of the 3 project Use Case particularly from the KPI perspective illustrate how the TRUSTS platform capabilities could be leveraged for different applications in each use case. According to the results received from each Use Case throughout the validation testing period, knowledge and findings were documented in deliverable D5.11 together with evaluation reporting and impact assessment for the use cases, and extracting lessons learned.

5 Critical Review and Outlook

TRUSTS' project delivery was a joint effort of all consortia partners towards fulfilling the overarching objectives and corresponding roles of the TRUSTS platform. IIA, in conjunction with quality management, played a crucial role in aligning partners and ensuring progress towards objectives and expected impacts. The Technical Lead adopted an agile approach, resulting in elevated responsiveness to business-technology alignment requirements. Interoperability solutions were explored with a focus on federation with the EOSC open data cloud system. The project also raised awareness of IPR issues as a pre-requisite for attracting a future platform operator. However, challenges such as practical validation of business models and access to counterparties of a data market or data market federation remain.

Bootstrapped efforts of attracting or establishing a platform operator for TRUSTS, to take on all project outputs for additional platform development and implementation of the conceptualized commercialization efforts were not successful. Thereby, whilst the mandates innovations specific to the project domains or to technical modules were delivered by the Work Packages, the future of a commercially operated TRUSTS data market after project end remains uncertain, if not unlikely.

5.1 Review of Progress towards DoA

Project delivery was a collaborative effort between all project partners within TRUSTS. Task 7.6 in conjunction with project quality management has been providing a meaningful contribution through its continuous interactions seeking to challenge and align all partners towards achievements of project objectives, techno-commercial roles to be fulfilled by the TRUSTS platform and delivery towards call topic and other significant expected impact.

Considering the adverse starting conditions, the project achieved good progress towards fulfilling the three overarching mandates (objectives) of TRUSTS and corresponding roles to be fulfilled by TRUSTS as a platform.

Notably, the Technical Lead adopted an agile delivery approach, and provided elevated responsiveness to business-technology alignment requirements. Jointly with the Task Lead for T3.3, interoperability solutions were interpreted and pursued with the required focus on enabling federation – at present, federation with an open data-rich open data cloud system (EOSC) is explored. WP7 also raised awareness and initiated project-wide dialogue related to resolving of IPR issues as pre-requisites for attracting any future platform operator, may this be directly (established infrastructure operator) or indirectly (new venture supported by an investor).

That said, several hurdles will still need to be overcome even after the project ended. Particularly the need for practical validation of the business models from T7.1, effected by the DMA not being operational, as well as the lack of readily available access to counterparties of an existing data market, to refine and validate business model and commercialization plans, is to be noted. Dialogue about establishing of a platform operator to carry project outputs beyond the project were pursued, but ultimate saw no success.

Project achievements towards call topics and other expected substantial impact are listed in table 4, below.

Table 4: Achieved progress towards call topics and other expected substantial impact

Call Topic Expected Impact 1
"Personal data protection is improved, and compliance with the General Data Protection Regulation (and other relevant legislation) is made easier for economic operators."
Project Achievements
- From the legal and ethical perspective, it was found that the TRUSTS architecture and privacy-preserving technologies enable the platform to be compliant with key data protection principles (data minimisation, purpose limitation, and data security) by establishing a new state of the art based on the combination of federated machine learning and advanced cryptography; and with ethical principles especially related to the fairness and transparency of data processing. The compliance of use cases with data protection law was also deemed satisfactory as they reach an optimal compromise between data privacy and data utility under current law, with the caveat that some legal issues (especially regarding AML law, the notion of controllership, and training data for AI) are still open and affect the TRUSTS experience. - Mechanisms for Data Stewardship and IP Protection as precursor for adherence to privacy preservation (T7.3 / deliverable D7.5). This also includes reporting mechanisms for observed misconduct - Privacy preservation, and compliance with GDPR as well as other pertinent regulations and standards as a centrepiece of the value proposition utilized in ongoing definition of the business model and commercialization plan (T7.1 / deliverable D7.2, and T7.5 / deliverable T7.8) - Analysis of EU legislation applicable to data sharing in B2B contexts such as the regulation of unfair commercial practices between businesses, mainly at national level, taking Germany, France and Belgium as an example. Based on the EC 'Guidance on sharing private sector data in the European data economy' of 2018, KUL provided consortium partners a non-exhaustive list of considerations which may help in the preparation and/or negotiation of data usage agreements. - DELL EMC is developing a "Smart Contract Executor" component along with support from T3.2 partners. The component will provide a library of smart contracts to service core operations of the TRUSTS platform as well as a ledger and blockchain in the back end. The component is currently operational in an early stage but is not yet integrated with other components.
Call Topic Expected Impact 2
"Citizens' trust is improved as privacy-aware transparency and control features are increasingly streamlined across data platforms and Big Data applications."
Project Achievements
- The cooperative approach between technical and legal and ethical partners enabled the TRUSTS platform to be equipped with adequate data protection safeguards gauged towards ensuring that data owners retain control over the data entrusted to them by data subjects. The legal and ethical guidance also

enabled data owners organisations to be fully aware of their data protection and information obligations before pooling data with other participating organisations.

- By relying on the Safe-DEED outputs, TRUSTS built on an architecture and concepts that put emphasis on the control by data subjects over their data.
- Exploratory research on the nature of data assets in the context of economically sustainable data trading as well as research of patterns and implications of platform orientation and platform orientation, on the example of data exchange and trading platforms in the automotive sector (T7.1)
- Elaboration of TRUSTS business model, positioned in the unified business-model centric taxonomy of data markets and data market federators as an ecosystem facilitator, strengthening multi-sided platform effects through increased solution-specific availability, co-creation, interaction, and combination of data assets (T7.1)
- Definition of stakeholder engagement mechanisms for fostering supply- and demand-sided use cases to move from "data as a product" to "data-as-problem-solution" (T7.2)
- Exploration of mechanisms for IPR protection and data stewardship as prerequisites for value-creation from data in a trusted environment (T7.3)
- Novel self-governance mechanisms building on the concept of a "TRUSTS DAO" (T7.3)
- Trainings and workshops (D8.6), publications and reports (see Output on the TRUSTS website), materials and design (D8.2), exploitation strategy/plan, dissemination, and communication strategy/plan (D8.1), external and independent SAB.
- Two connectors for the EOSC initiatives OpenAIRE and Europeana were developed were developed as well as another component to programmatically load metadata of datasets into TRUSTS. The latter solution helps to map data catalogs from external sources, e.g., third-party datamarkets, thereby enabling streamlined data exchange across platforms (T3.3)

Call Topic Expected Impact 3

"Better value-creation from personal and proprietary/industrial data."

Project Achievements

- Better value creation for the users using the business applications under WP5 / the UCs while the data providers increase (WP5).
- IPR protection: WP7 developed concepts and measures for Intellectual Property Rights (IPR) protection in data asset exchange through the TRUSTS platform. This ensures that the participants' data is protected and secure, leading to better value creation from personal and proprietary/industrial data. (WP7)
- Data stewardship: WP7 started with a data stewardship concept for TRUSTS participants, ensuring that the data exchanged through the TRUSTS platform is treated responsibly and ethically. This leads to better

value creation from personal and proprietary/industrial data as participants are confident that their data is being used in a responsible manner. (WP7)

- Concrete and well-defined use-cases ensure that technology innovations in WP3 and WP4, were effectively adopted in WP5.
- Business model innovation extrapolated from the use-cases in WP7, together with communication activities in WP8 ensure that impact is extended beyond TRUSTS
- Dissemination and communications strategies by WP8 raised awareness for TRUSTS platform's capabilities, leading to greater interest & adoption, boosting value from personal & proprietary/industrial data.
- WP8 facilitated networking and partnerships, leading to collaboration, shared expertise & resources, and new business models, leading to increased value from data.
- Community building by WP8 created a supportive environment for interest in TRUSTS platform, allowing potential users to exchange knowledge and experiences, leading to better data value.
- WP8 ensured widespread dissemination of TRUSTS project outcomes, building a knowledge base on data exchange and promoting best practices, leading to increased data value.

Call Topic Expected Impact 4

"20% annual increase in the number of data provider organisations in the personal and industrial data platforms. 30% annual increase in the number of data user/buyer organisations using industrial data platforms. 50% annual increase in number of users (data subjects) in the personal data platforms."

Project Achievements

This aspired impact can be understood as a longer-term, directional co-contribution to the European data economy, in particular through the novel concept of data exchange / data market federation, overcoming the fragmentation and lacking interoperability in the European data landscape. As impact manifests itself along the axis of project activity - project output - outcome impact, the overall project contributes to this longer-term vision.

- Foundational research in data markets and data market federations, which yielded a business-model centric, unified taxonomy (T7.1)
- Delivery of 3 project use cases (field trials results as per reports D5.5, D5.7, and D5.9). The overall performance of the UCs (WP5) was measured by the success against a set of targets and objectives. Few of the KPIs per UC that were defined along with the baseline and target values for M36 evaluation while performing adequate number of trials were the 'Number of data providers interacting with the Platform' and the 'Number of end-users interacting with the Platform'. Both target values (Minimum 10 by M36 (+400%)) were successfully achieved by M36.

- IPR protection measures: WP7 developed IPR protection concepts, making the TRUSTS platform more attractive to data providers and users, contributing to the objective of increasing their number. (WP7)
- TRUST-DAO model: The establishment of a TRUST-DAO for managing services and software licences provides a secure and transparent way to protect IPR, contributing to the objective of an increase in the number of partners to contribute and enhance software, which results in increased software functionality and therefore more data providers and users.
- WP8 carried out awareness campaigns and webinars to educate potential data providers and data users/buyers. TRUSTS also organised events and networking opportunities to bring together potential users and form partnerships. Additionally, the consortium engaged in the frame of WP8 with users through feedback sessions and surveys to understand their needs. TRUSTS also fostered partnerships with relevant organisations to increase the reach of the platforms.

Other Substantial Expected Impact (i)

"Appropriate consideration and attention towards an ethically sound approach to big data processing, and effective involvement of the relevant actors and stakeholders."

Project Achievements

- Project partner KUL conducted desktop research on all the legal frameworks relevant for data transactions that will be guiding the partners throughout the project. D6.1 on ethics requirements was submitted. Furthermore, KUL addressed 10 ethics requirements within WP9.
- WP7 conceptionalised dataNFT in a TRUSTS-DAO model, providing a secure and transparent way to protect TRUSTS members' IPR and manage the usage and ownership of software licenses and components in the TRUSTS platform. This leads to better value creation as participants are confident that their contribution to further develop the TRUST platform is appreciated.
- Utilization of supporting institutions like Data Space Support Centre (DSSC) and other enablers.

Other Substantial Expected Impact (ii)

"Improving the confidence of citizens towards Big Data technologies and data markets. Creating a trust environment for data transactions. Protecting fundamental rights of citizens."

Project Achievements

- From the fundamental rights perspective, the TRUSTS project was built on the premise that any data sharing operation needed to be envisaged in full respect of the rights to privacy and data protection enshrined in the EU Charter. The legal and ethical partners elicited requirements drawn from the Charter and related CJEU case law. The technical approach to preserving privacy and protection of personal data, guided by the legal and ethical review, was deemed to provide well-rounded guarantees to data subjects' fundamental rights.

- Specifically with regard to UC1, the legal and ethical assessment put forward an approach to ensure, under current law and interpretation, a sound balancing of law enforcement and data protection objectives for public measures aimed to fight money laundering. The approach focused on fulfilling the requirements of Article 52(1) of the EU Charter, in such a way that any AML system deployed by private entities in compliance with AML measures is able to achieve its objectives while respecting data subjects' fundamental rights.
- Multi-channel communications approach: Website, SocialMedia (Twitter, LinkedIn, Researchgate, Youtube), press releases (CORDIS, APA via RSA), Newsletter, Webinars, Podcasts.
- set communication activities focusing on citizens' trust towards data markets e.g. highlighting legal aspects, privacy preservation etc.
- Knowledge Base and interactive learning tool, Social Microlearning
- Analysis has been done in relation to data transactions related frameworks, including financial frameworks, B2B relationships, data sharing agreements, privacy enhancing techniques. The work on the Chapter on trustworthy data sharing has been carried out in cooperation with the TRUSTS partners.
- DELL EMC contributed an article to the TRUSTS newsletter on the topic of privacy preservation around smart contracts - proliferating knowledge that such technologies can be implemented in a privacy-sensitive manner.
- The research carried out on security enhancing and privacy preserving approaches for smart contracts and blockchain system was used to account for updating of smart contracts in a way that circumvented the blockchain's immutability: on-chain pointers and off-chain isolated, containerized smart contracts (rather than on-chain smart contracts) was the model utilized for the TRUSTS smart contract demonstrator blockchain. This work is presented in D3.3.

Other Substantial Expected Impact (iii)

"Improved confidence and satisfaction of data subjects by the end of 2020."

Project Achievements

- WP8 disseminated project results and raised awareness via Newsletters, Website and Social Media.
- Analysis to make sure that the TRUSTS consortium respects GDPR, ePrivacy Directive and other relevant frameworks such as DSA, DMA and Data Governance Act.
- The publication output of TRUSTS saw partners publishing 22 articles in total. All "ICT13-2018-2019 specific challenges" have been addressed.

Other Substantial Expected Impact (iv)

"Substantial improvements towards creating a secure environment for data access, process and analysis, demonstrated in the use situations that arise in the data experimentation /integration projects."

Project Achievements
- Reports have been published and are being developed for informing the partners on security related legal frameworks such as Paris Call for Trust, NIS Directive and the updated NIS 2 Directive. - Research was conducted which collated a list of common vulnerabilities in blockchain based and smart contract utilizing systems. This research was underpinned by writings based on sources which detailed past practical attacks against such systems. The full writings can be found in D3.3. - Research was conducted to assemble a list of security enhancing and privacy preserving technologies and approaches which are applicable to blockchain and smart contract-based systems, these included; approaches for updating smart contracts in the context of immutable blockchain, leveraging secure enclaves, secure multi-party computation, and more. This work can be found in D3.3, though technical implementation of this work was mostly out of scope.
Other Substantial Expected Impact (v)
"Protection by design"
Project Achievements
- The design of the "Smart Contract Executor" component was aware that public blockchain technology does little to preserve privacy and thus a focus on a consortium blockchain (public/private hybrid) approach was taken.

5.2 Outlook

The TRUSTS project laid important groundwork for the establishment of a TRUSTS OpCo by developing necessary artefacts and concepts. The notion of developing a self-sustaining data market was too ambitious. EU's efforts regarding the Gaia-X approach show that much more groundwork is needed in the areas of standardization, interoperability, and particularly in preparing organizations that will later use the data market. A market for, say, vegetables does not develop on a "greenfield," but takes many years to grow from a single market stall to a large bazaar.

During the project duration, it was not possible to establish an operating company with the existing consortium, which could have immediately started building and operating a TRUSTS platform after the project. The interests of the participants, who were composed of scientific and private companies, were too different. Scientific organizations had difficulties getting involved in a TRUSTs OpCo as shareholders because they are mostly public institutions. On the other hand, the participating SMEs did not have the financial room for the investments that would have been necessary to establish a TRUSTs OpCo. As a result, no one from the TRUSTs consortium wanted to continue operating the TRUSTs platform alone or together. One important reason for this was certainly that the technology with the TRUSTs platform has developed a functional infrastructure, but for a productive implementation in an industrial environment, the individual components must be deeply interlinked. This task could only be done to some extent within the TRUSTs project. A future operating company would therefore have to first deal with the technical interlocking of the technical components and then move on to establishing the business model.

If it is possible to keep the initial start-up costs low enough through a model like the TRUST-DAO elaborated by T7.3, chances of establishing a TRUSTs OpCo could be increased. But the consortium members must be willing to also take on entrepreneurial risk. Here, there probably need to be special incentives, such as for research institutions, to be willing to carry entrepreneurial risk. If that is not the case, only an external investor would be needed to raise the funds for the start-up costs and then start entrepreneurially.