TRUSTS Trusted Secure Data Sharing Space

D7.7 "Business plan and implementation action plan I"

Document Summary Information

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Glossary of terms and abbreviations used

Abbreviation / Term	Description
AGPL	Affero General Public License
AI	Artificial Intelligence
Airbnb	A lodging reservation website from Airbnb, Inc., San Francisco, CA (www.airbnb.com) that lets property owners list their spare room apartment or home in thousands of cities worldwide[1]
API(s)	Application Programming Interface
B2B	Business to Business
B2C	Business to Consumers
B2G	Business to Governance
B2S	Business to Services
B2S	Business to Science
BSD	Berkeley Software Distribution
BSS	Business Support Systems
C2B	Consumer to Business
CA	Consortium Agreement
CAPEX	Capital expenditures
CC	Creative Commons
CKAN	Comprehensive Knowledge Archive Network
CRM	Customer Relationship Management
DLICC	Data Licenses Clearance Centre
E2E	End-to-End
eBay	a Web site on the Internet where people can auction goods (= sell them to the person who offers the most money for them)[2]
EOSC	European Open Science Cloud
EU	European Union

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[1] Airbnb Meaning | Best 1 Definitions of Airbnb (yourdictionary.com)

[2] https://www.oxfordlearnersdictionaries.com/definition/american_english/ebay

FDA	Food and Drug Administration
G2B	Governance to Business
GA	Grant Agreement
GAIA-X	Project for the development of an efficient and competitive, secure and trustworthy federation of data infrastructure and service providers for Europe, which is supported by representatives of business, science and administration from Germany and France, together with other European partners.
GDPR	General Data Protection Regulation
GNU GPL	GNU General Public Licence, a series of widely used free software licenses
GPL	General Public License
IDSA	International Data Spaces Association
IoT	Internet of Things
IP	Intellectual Protection
IPR	Intellectual property Rights
KER	Key Exploitable Results
LGPL	Lesser General Public License
MIT	Massachusetts Institute of Technology
ML	Machine Learning
MSMBs	Micro and Small & Medium Business (es)
OpCo	Operational Company
OPEX	Operating expense
OSS	Operations Support Systems
OTT	Over the top
PaaS	Platform-as-a-Service
PESTLE	Political, Economic, Social, Technological, Legal and Environmental factors
PIC	Person in Charge
RoD	Registry of data
S2B	Services to Business

SaaS	Software-as-a-Service
SLA	Service Level Agreement
SMEs	Small Medium Business (s)
TRL	Technology readiness level
TRL	Technology Readiness Level
TRUSTS	Trusted Secure Data Sharing Space
Uber	American company that provides its international customers with chauffeur-driven transportation vehicles (VTC) through its mobile application software (app),2 which connects passengers with drivers of vehicles registered with its service, who offer a transportation service to private individuals.
UC	Use Case
USA	United States
USPs	Unique Selling Propositions

Executive Summary

This Deliverable 7.7 arises from Task 7.5 "Commercialisation initiatives and action plan" of the Work Package 7 "Business Model, Exploitation & Innovation Impact Assurance" of the Trusted Secure Data Sharing Space (TRUSTS) project.

In commercialization, the business model designed in Task 7.1 "Sustainable Business Models", will assist the TRUSTS project in defining a strategic plan of action to ensure the sustainability and financial viability of the project. The goal of Task 7.5 is to explore and define the strategy for bringing TRUSTS to the market. It will also develop a pricing model intended for the use of the TRUSTS services and a remuneration model for partners contributing technology to the TRUSTS services, but also for organisations that have contributed resources. The interdependence with Task 7.1 effects that detailed business planning can only commence upon provision of sufficiently granular business model options, i.e., in the second half of the project.

This task will also carry out a technology watch to identify potential competitors to TRUSTS entering the market. Finally, a business plan for the TRUSTS services, the cloud hosting and operations of the TRUSTS Professional Partners Community will be created, to ensure sustainability and financial viability after the end of the project. The form in which the TRUSTS Professional Partners Community will be instantiated beyond the end of the project will also be decided and implemented in this task.

The objective of this deliverable is to describe the strategy of the TRUSTS consortium to transform the platform into a sustainable ecosystem. It includes the presentation of the TRUSTS evolving business plan (incl. business target, services, pricing, costs, remuneration of partners, etc.). This is the first version of this report, D7.7 "Business plan and Implementation action plan I", that will be updated within the duration of the project and presented in a second version in June 2022 (M30), as D7.8.

In essence, the goal of this report is to analyse how TRUSTS platform can successfully enter the European market and achieve profitability, while overcoming potential limitations.

1 Introduction

Cloud Computing, Web 2.0, IoT and other technologies are evolving rapidly and are promoting data generation, transmission, and information extraction over the last years. Data is being produced every second by instrumented machinery, and citizens and organisations are a constant source of information because of the increasing use of IoT, and sensor data produced by digital equipment. A new asset in the digital world is the large amount of information.

The TRUSTS 'Trusted Secure Data Sharing Space' project aims to launch a reliable, safe, and secure data exchange platform compliant with the regulations to contribute to the European ambition for positioning and growth in the data-driven economy, as e.g., outlined in the European Data Strategy.

The Deliverable D7.7 "Business plan and implementation action plan I" of the TRUSTS project is part of WP7 "Business Model, Exploitation & Innovation Impact Assurance" and describes the strategy of the consortium to transform the platform into a sustainable ecosystem, crystalized as TRUSTS business plan (defining business targets, services, pricing models, operational costs, remuneration of partners, etc.).

A data sharing is needed in the data economy to make data available for companies that wish to develop smart systems and innovative services. While digital markets for trading data are emerging, there is no consolidated understanding of how to price data products, offering data vendors incentives for sharing data.

Marketplaces are enablers for the exchange of data. A data marketplace is a platform on which data assets can be listed, offered, accessed, and traded. Marketplaces enable trade by offering services for buying and selling data, finding datasets, obtaining access to vendors, and contracting. Often cited examples are the Microsoft Azure Marketplace, DAWEX, Xignite, Gnip, AggData, and Cvedia. Data assets offered may be static archives or online streams of near / real time data, and data-processing applications. Different modes of access may be offered, e.g., whole repositories, data subsets accessed through APIs for direct queries, or data subscriptions. Such variants are called "data products".

In the table below different types of data markets are displayed according to its characteristics.

Table 1 Classification of data marketplaces characteristics

Attribute	Characteristics
Value proposition	Transaction-centric / Data-centric
Market positioning	Based on certain characteristics/price/quality/application/competition
Market access	Closed /Hybrid/Open
Data displayed	Raw data /aggregated data
Price model	Fixed price subscription /pay per use /progressive price /free
Revenue model	Access fee/ transaction fee/commission/listing fee/service fee/ flat rate /free

The commercialisation plan is designed to maximise the impact of the TRUSTS development and prepare the transition towards market uptake, in order to ensure the exploitation beyond the project itself.

The methodology for creating the business plan comprises of the following building blocks:

- • Identification and definition of the TRUSTS exploitable results
- • Definition and alignment of the TRUSTS IPR management strategy
- • Development of the market analysis
- • Definition of the common exploitation approach
- • Definition of individual business plans for the partners exploiting their results

1.1 Mapping Project's Outputs

Purpose of this section is to map TRUSTS Grant Agreement (GA) commitments, both within the formal Deliverable and Task description, against the corresponding project target outputs and work performed.

Table 2 Adherence to TRUSTS GA Deliverable and Tasks description

TRUSTS Task Description		Respective Document Chapter(s)	Justification
T7.5 Commercialisation initiatives and action plan	This task will explore the strategy for bringing TRUSTS to market. It will also develop a pricing model for use of the TRUSTS services and a remuneration model for partners contributing technology to the TRUSTS services, but also for organisations that have contributed resources. This task will also carry out a technology watch to identify potential competitors to TRUSTS entering the market. Finally, a business plan for the TRUSTS services, the cloud hosting and operations of the TRUSTS Professional Partners Community will be created, to ensure sustainability and financial viability after the end of the project. The form in which the	Sections 1 - 9	Section 1: Introduction

Section 2: TRUSTS mandates and an approach for implementation action plans

Section 3: TRUSTS business targets

Section 4: TRUSTS potential Value proposition and services

Section 5: Remuneration of partners

Section 6: Resources / costs |

	TRUSTS Professional Partners Community will be instantiated beyond the end of the project will also be decided and implemented in this task.		Section 7: Commercialisation alternatives Section 8: Pricing models Section 9: Conclusions and next actions

TRUSTS Deliverable

D7.7 Business plan and Implementation action plan

This document describes the strategy of the TRUSTS consortium to transform the platform into a sustainable ecosystem. It includes the presentation of our business plan (incl. business target, services, pricing, costs, remuneration of partners, etc.). The document will be updated several times during the project and presented in 2 versions in M18 as D7.7 and M30 as D7.8.

1.2 Deliverable Overview and Report Structure

The structure of this deliverable is the following:

✔ The document starts with a reference to the work packages and tasks within the TRUSTS workplan that will have an incisive direct impact on the definition of the business and commercialisation strategies.

✔ It continues with the approach that the Consortium will be using for the implementation of the action plans, reflecting on the role that TRUST should have in the European Data Economy, specifically in Section 2.

✔ Business objectives, including TRUSTS stakeholders and identification of the key exploitable results, with their possible business models, are discussed in Section 3.

✔ Section 4 defines what the value proposition of TRUSTS is and what distinguishes it from its possible similar sector-peers.

✔ In Section 5, the possible avenues of remuneration for data or software owners operating on the platform are discussed.

✔ The definition of what types of costs and resources will need to be considered when establishing the commercialisation strategy are offered in Section 6.

✔ Next, possible commercialisation alternatives that TRUSTS envisage in this first phase of the project are described in Section 7, while in Section 8 the pricing methods that could be used in the final version of the platform, to be launched at the end of the project are provided in detail.

✔ Finally, <u>Section 9</u> is devoted to the conclusions and next actions to conclude the first release of the Commercialisation and Action Plans.

1.3 Interdependencies of Task 7.5 with other tasks in the project

In order to successfully reach the marketing stage, a sequence of steps necessary to turn an opportunity into a business must be followed.

The different TRUSTS work packages are designed with the objective of covering this process, and it is from this sequence that the specific task of Commercialisation is nourished as illustrated in figure 1 below:
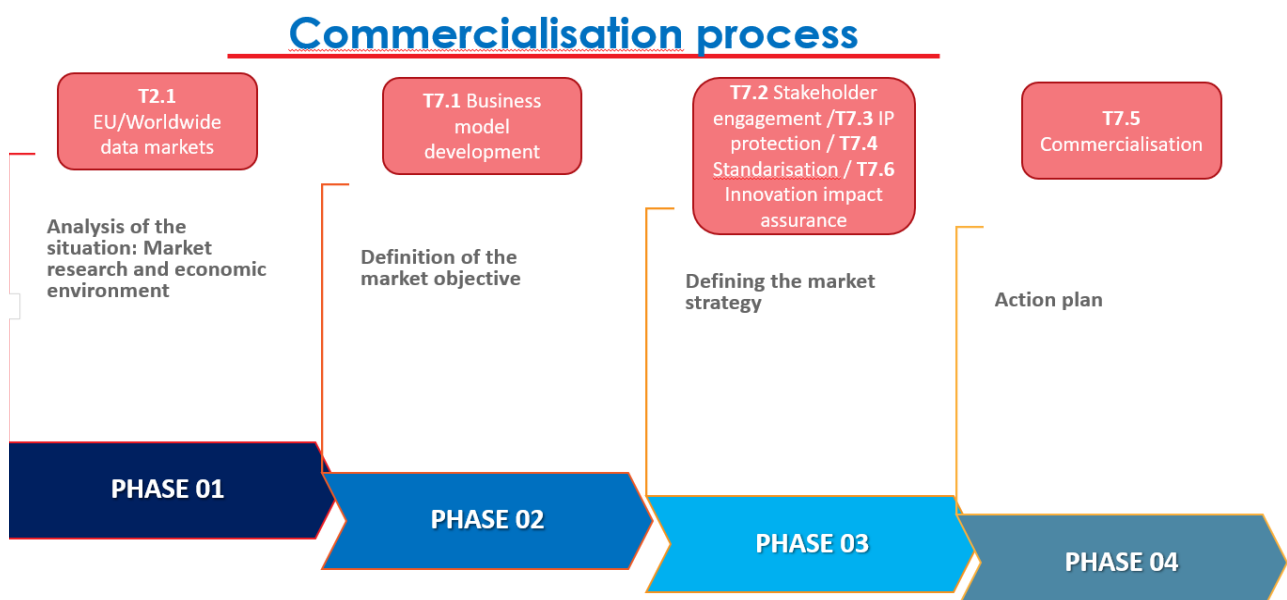
Figure 1 Commercialisation task' interdependences

Accordingly, the tasks depicted in the figure above generate related deliverables which are listed in figure 2 below:

T2.1 EU and wordwide data market	D2. 1 Definition and analysis of the EU and worldwide data market trends
T2.3 Testing framework and benchmarking	D2.3 Methodologies for the technological / business validation of the use cases
T7.1 Sustainable business models	D7.1 Sustainable business model for TRUSTS data Marketplace
T7.2 Developing and structuring	D7.2 Communities engagement strategy
T7.3 Intelligent Property and data stewardship	D7. 3 Supporting mechanisms for intellectual property rights protection
T7.9 Innovation Impact Assurance	D7.9 Innovation Action assurance

Figure 2 Related deliverables

Within the Work Programme, tasks such as 2.2 "Industry - Specific functional requirements elicitation and analysis" along with the feedback to be received from the project Use Cases which will showcase the sharing, trading, and use of data and services, from WP5 "Demonstration of the TRUSTS Platform in 3 business – oriented Use Cases", will also be impacting the business models and potential commercialisation plans, and its outcomes will be monitored and taken as key reference over the course of the project, and used when deciding the final commercialisation strategies.

2 TRUSTS Mandates and an Approach for Implementation Action Plans

This section builds on the reports "D2.1, Definition and analysis of the EU and worldwide data market trends" and "D7.1, Sustainable Business Model for TRUSTS Data Marketplace I". This section will reflect and expand on the two deliverables mentioned and will also offer an approach for developing future implementation action plans for TRUSTS.

2.1 The TRUSTS Project Mandates: Reflection on TRUSTS' Roles in the European Data Economy

D7.1 highlights TRUSTS' roles within the European Data Economy. These encompass TRUSTS acting as:

a) *data marketplaces*,

b) *a federator*, and

c) *an ecosystem* facilitator of data marketplaces.

D2.1 reveals that data marketplaces can be distinguished based on *orientation and ownership determinants* (see Figure 3). Building on this, D7.1 positions TRUSTS as a **many-to-many/multi-sided marketplace for data assets** (data sets, data services, data applications). *"From the ownership determinant, TRUSTS is a third-party data marketplace owned by multiple independent parties. TRUSTS does not have its own datasets. It aims to facilitate data trading between data providers and data buyers. Moreover, TRUSTS has a market orientation trading structure, implying that prices are determined by data providers and buyers depending on competitive offerings."*

As concluded by D7.1, a working definition of a data marketplace for TRUSTS is as follows.

> **Data marketplace definition for TRUSTS**
>
> TRUSTS as a data marketplace is a digital platform, acting as an independent third-party that connects and facilitates data trading and financial transactions between data providers and data buyers.
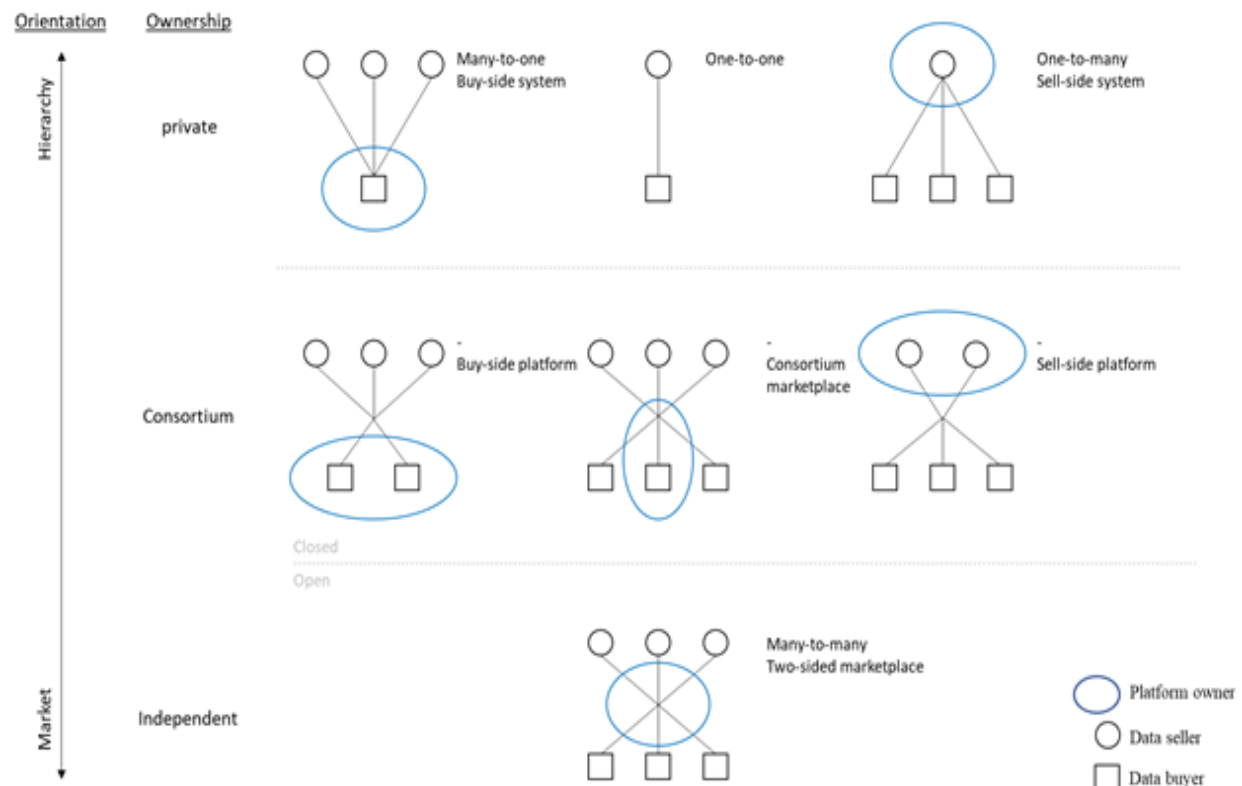
Figure 3 Data marketplaces' types

To be more specific, TRUSTS must also position relative to three broad types of data marketplaces based on *to whom they are designed for* and *where the data is sourced from*. These are:

1. **Personal Data Marketplaces:** Decentralised data marketplaces responding to consumer reticence of their personal and sensitive data being used by technological firms, without commercial benefit for the data subject. These platforms allow the individuals to share information about their online behaviour and location whilst in exchange he/she is paid for sharing their data on a consent agreement basis. They are usually paid in the form of vouchers or gift cards. Examples of personal data marketplaces are Datum[3], SynapseAI[4], and Datawallet[5].

2. **Business to Business (B2B) Data Marketplaces:** These are marketplaces for data to be traded between business and organisations, for companies that want to monetise their data at scale. B2B data marketplaces are a demand generation platform for commercial data providers and (SaaS) vendors. They operate following diverse business models: subscription and pay per use, others

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[3] https://datum.org/ accessed on June 11, 2021
[4] https://blog.synapse.ai/ accessed on June 11, 2021
[5] https://datawallet.com/ accessed on June 11, 2021

offer a free route for data monetisation where the vendor only pays when their data is sold. Examples of this type of B2B marketplace are Datarade[6], Eagle Alpha[7], and Oracle[8].

3. **IoT Data Marketplaces:** The intelligence produced by the IoT is bought and sold through this type of data marketplace. The source of this IoT market is from the web of interconnected devices, providing buyers real-time signals from millions of digital interfaces. The pricing options for these IoT data markets are flexible, like pay-per-hour, which is aligned with the open network supported by this kind of data marketplace.

In correspondence to TRUSTS' vision, TRUSTS as a data marketplace will take the direction towards both a **Personal** and **B2B Data Marketplace**. This aligns with the positioning of TRUSTS in D7.1 that targets the broad sector ranging from SMEs, large enterprises to civic society. Nevertheless, TRUSTS is less likely to be an IoT data marketplace since TRUSTS does not own IoT devices.

The D7.1 also summarizes the working definition of *a federator and an ecosystem facilitator of data marketplaces - s*ee figure 4 below for the illustration. Future implementation action plans of TRUSTS need to consider these three roles.
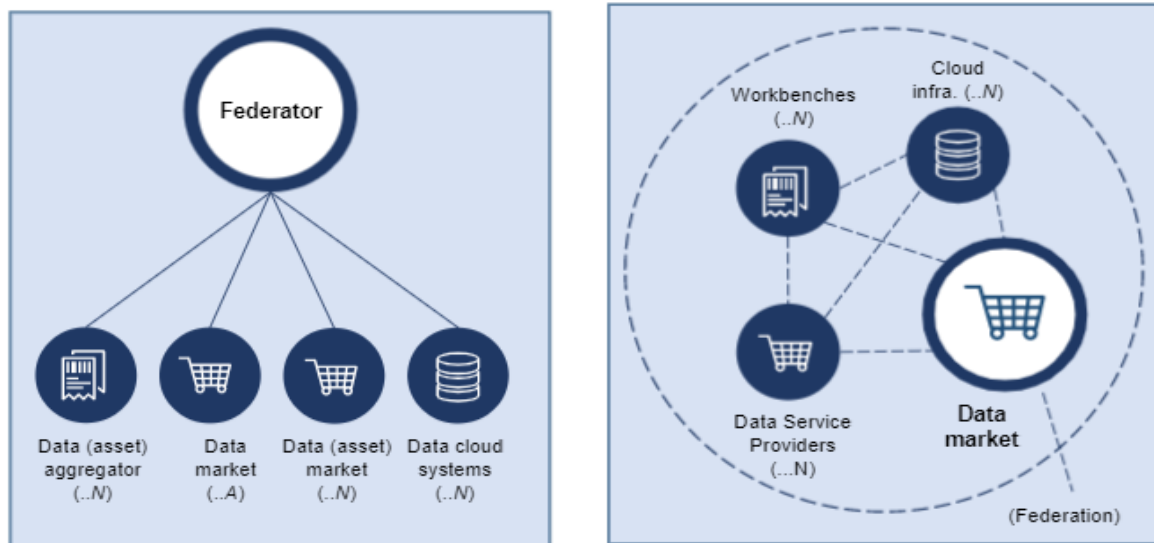
Figure 4 Illustration of a federator and an ecosystem facilitator of data marketplaces

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[6] https://datarade.ai/ accessed on June 11, 2021

[7] https://eaglealpha.com/ accessed on June 11, 2021

[8]https://docs.oracle.com/en/cloud/saas/data-cloud/data-cloud-help-center/AudienceDataMarketplace/AudienceDataMarketplace.html accessed on June 11, 2021

A federator of data marketplaces

As a federator of data marketplaces, TRUSTS is a platform with a simple hub & spoke model (1:n) that coordinates and integrates different data marketplaces' resources and solutions (e.g., data listing) via centralized efforts to organize collective actions by enforcing common policies, standards, and infrastructures.

An ecosystem facilitator of data marketplaces

As an ecosystem facilitator, TRUSTS' role goes beyond coordinating and integrating different data marketplaces. TRUSTS facilitates the complex web of services and communities through facilitating access to vital resources and ensuring that different stakeholders participating in a data ecosystem can benefit from the interactions and integration of resources across the ecosystem.

2.2 An Approach for Developing Future Implementation Action Plans

This subsection offers consideration for an approach for developing future implementation action plans. It is inspired from the framework of the business model tolling provided by Business MakeOver (https://businessmakeover.eu/). Resulting from the extensive four years of research, this business model tooling is specially developed to support business model innovation. It can inspire and guide the development of implementation action plans for TRUSTS (see Figure 5); It can be the starting point to identify the high-level action items.

implementation plan

name _____

Business idea

	Actions	Critical	Responsible	Deadline
People				
Processes				
Technology				
Partners				
Knowledge or materials				
Marketing or sales				

date _____

inno valor

Figure 5 Template for the implementation plan

In summary, four primary steps need to be taken to create implementation plans, according to https://businessmakeover.eu/.

First, core innovations need to be defined. In the TRUSTS case, considering three TRUSTS roles and core Unique Selling Propositions (USPs) in the European Data Economy can be a starting point. For example, TRUSTS, a data marketplace, offers data sovereignty, security, and GDPR complaints as USPs. After defining the core innovations, some concrete actions to achieve these USPs need to be defined.

The actions should cover six dimensions of activities (provided as well in figure 5 above), and these are:

a) *people,*
b) *processes,*
c) *technology,*
d) *partners,*
e) *knowledge or materials, and*
f) *marketing or sales.*

Next, these actions need to be assessed on whether they are critical, and hence, highly impacting the development of business implementations. For instance, finding a party to run TRUSTS as an operator will be a critical moment and cannot be easily reversed. It needs decent preparation. Finally, every action item needs to be bound into a clear timeline. The Person in Charge (PIC) who is responsible for specific actions also needs to be defined.

3   TRUSTS Business targets

TRUSTS aims to develop a data sharing platform for secure, trustworthy, and GDPR-compliant data exchanges from data providers to consumers. Targeting individual and industrial use, while enriching the existing data market technologies and components with new functionalities and services to scale out.

3.1   The TRUSTS Stakeholders

To identify stakeholders for TRUSTS, it is important to consider the commitment of TRUSTS in building a data ecosystem that is a trustworthy and secure backbone for a European data economy. Given the overarching role of TRUSTS potential stakeholders on TRUSTS cannot be limited to a few groups of users. Accordingly, when talking about stakeholders of TRUSTS, it extends to any group or individual who can affect or is affected by the ecosystem's services. To identify potential stakeholders for TRUSTS, a Target Market analysis was conducted.

Target Market Analysis: Target marketing is focusing on a specific segment of the total business market. The rationale for a target market analysis is too narrow from a broad list of stakeholders to identify specific customer segments that TRUSTS can focus on. Target Market Analysis thus gives a picture of an outside view of the market (Cahill, 1997). The essential goal of Target marketing is to ensure TRUSTS gain a competitive advantage. Target Marketing is also informed by inputs from T2.1 which examines the micro and macro environment of data marketplaces using Porter Five Forces, the "Political, Economic, Social, Technological, Legal and Environmental factors" (PESTLE) framework, and other insights from workshops on the positioning of TRUSTS. Thus, a target Market analysis helps ensure insights for distinct groups of customers and how they could potentially affect the future profitability TRUSTS examined. Through target market analysis, areas that are less viable for example due to the ease of substitutes are identified. However, it is important to consider that in the long-term new business opportunities might emerge and thus target market analysis needs to be conducted over time as TRUSTS evolves.

Segment: The first step into target marketing is segmentation. Segmentation involves categorising customers into distinct groups based on commonly shared needs or characteristics. Based on the segmentation specific customer groups can be identified, targeted incentives for the different user groups. Four variables were used as basis to broadly capture different   customer segments:

1. Geographic,
2. Demographic,
3. Psychographic and
4. Behavioural segmentation.

Geographic segmentation broadly divides the targeted market based on geographical location. Geographical locations can be regions within a country. Given TRUSTS initial focus is within the EU, the segmentation focused on the EU level to position TRUSTS so that it competes with other regional areas such as the complete USA and China. This focus is also aligned with EU strategy to enhance the competitiveness of firms with the EU.

Demographic segmentation: divides the market through demographic variables such as gender, income, education, nationality, and social class. For TRUSTS this would mean that they should focus on companies

with highly educated people as these types of people tend to build the models for their company which requires data.

Psychographic segmentation: is using the science of psychology and demographics to understand consumers. It concerns the values, personalities, and interests of the customers. This means that the companies should be chosen who fit the values of safety and reliability. Furthermore, the meta-platform should have a layout that clicks with the customer, such to have that personality touch.

Behavioural segmentation considers the attitude of the customer towards the meta-platform. Here, factors play a role such as usage rate, brand loyalty, user status. For TRUSTS, it means that you not only want to target regular users, but also potential users such that your network keeps growing. It is advisable to clearly look at growing markets.

The important points for the different segmentation variables are summarized in the below figure 6:
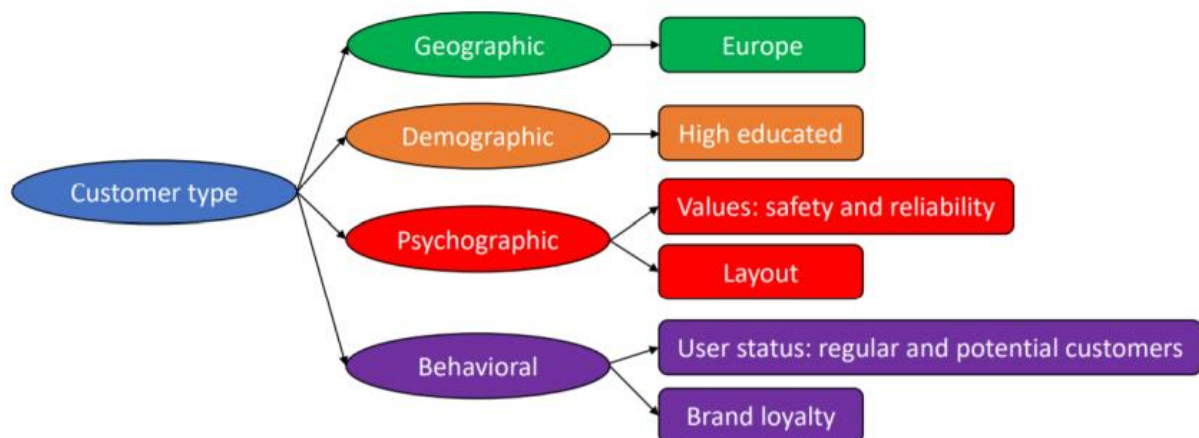
Figure 6 Segmentation tree divided into four variables

The question that follows is, how TRUSTS should choose the most attractive market after knowing these different variables and factors? For this, the different sectors that TRUSTS already incorporated and complemented it where that was required, were considered (TRUSTS, 2021a). After that, the most important factors were chosen, and linked to the different sectors.

There are several types of Customer segments to consider when analysing potential business models and these are:

➢ **Mass market**: When the services or products are attractive or meet the needs of a large part of the population and do not discriminate between different customer segments. This means that value propositions and customer relationships are intended for many customers who have a communal problem or need. There is no need consequently for the provider to differentiate between product or services.

➢ **Niche market**: This model is intended for a smaller customer segment, extremely specific and specialised, since they have very particular needs and characteristics. This segment requires a

highly personalised product or service, even tailor-made. For this group of customers, value propositions, and customer relationship management are defined according to their strict preferences.

➢ **Diversified**: This segment is focused on customers with completely different needs and requirements.

➢ **Segmented**: The seller develops products or services for different segments of customers with subtle variations regarding their needs and interests. In this case, many value propositions, and customer relationships are generated according to these slight differences.

➢ **Multilateral platform**: This market serves two or more customer segments, and such segments tend to be independent of each other, this means that so that the business functions, it is necessary to satisfy both sides.

Setting up a European Data Market involves interaction between various stakeholders and the integration of interests of many parties. Open discussions with stakeholders from large, small, and medium enterprises, as well as with existing non-governmental organisations accommodates this commitment. TRUSTS brings together technology providers that are already deeply involved in existing major national data market projects to create a European Data Market based on secure and trustworthy data exchanges.

TRUSTS' stakeholders will provide unique insights as per the TRUSTS platform, e.g., by highlighting areas where the TRUSTS solution will add value.

To demonstrate and realise the added value of the TRUSTS platform, three business-oriented use cases showcase the sharing, trading, (re)use of data and services, and added value generated through innovative applications built on multiple open and proprietary data sources. The use cases target corporate business data in the financial and telecommunications operator industries.

TRUSTS targeted customers must be analysed, in order to segment in an efficient way, the existing and the potential customers, and to design the market strategy to improve its effectiveness. Data transactions involve four main actors: data creators, data demanders, service providers and market makers.

Potential data intermediaries in TRUSTS ecosystem to be considered are listed I the table below:

Table 2 TRUSTS Ecosystem

Ecosystem	Activity
Data providers	Search and find, technical and non-technical activities bringing data
Data brokers	Communication channel between data offer and demand
Data scientists	Understand, clean, scale, deploying digital technologies trained on-the-job
Business Domain Experts	Trade-off, service linking

Resource providers	Integrate services, bringing technology, application developments
Data consumers	Data request. Skills, competences, and best practices fostered
Data Operators	Infrastructure maintainers, management, and data usage control: incubators and accelerators of data driven innovation

Although the economic main driver is business at the centre of our environment, in addition to B2B cases, TRUSTS ecosystem should also consider Business to Governance (local, national, and European governments and public bodies) and vice versa (B2G, G2B), Business to Science (Research and Academia) and vice versa (B2S, S2B) as well as Consumer to Business (C2B) opportunities. The same way, different combinations may arise depending on the degree of customisation to a particular stakeholder group or depending on the type of relationship with them, meaning punctual.

3.2   The TRUSTS Potential Key Exploitable Results (KERs)

In this subsection, the TRUSTS potential Key Exploitable Results (KERs) will be described. A KER is "an identified main interesting result…which has been selected and prioritized due to its high potential to be exploited – meaning to make use and derive benefits – downstream the value chain of a product, process or solution, or act as an important input to policy, further research or education."[9] According to the European Commission's   website, a KER can be assessed based on its:

1) degree of innovation,
2) exploitability, and
3) impact.

Even if the Consortium should focus on the TRUSTS platform as a KER, we could also explore and identify other KERs based on the TRUSTS building blocks (such as services, products, methodologies). TRUSTS Consortium has established an Innovation registry document, in which all the potential exploitable results arising from the project are registered and monitored. So far, the possible TRUSTS KERs are described in Table 4 below, and in the next version of this deliverable, the list of the identified KERs will be updated and assessed.

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[9] https://ec.europa.eu/newsroom/informatics/items/689551 accessed on June 11, 2021

Table 3 TRUSTS Key Exploitable Results (KER)

KER no	Result category	Project KER	Owner	Source	Added value
1	Methodology	Agile marketing	UC2 partners (FNET, FORTH, LST, PB, KNOW)	TRUSTS innovation registry document	Data correlation between different enterprises in a GDPR compliant manner
2	Product	Privacy in recommender systems	Know-Center	TRUSTS innovation registry document	Recommender systems are typically known for consuming many private user data (e.g., clicks, demographics). Privacy-aware recommender systems try to minimize the needed data and at the same time preserve accuracy.
3	Product	De-anonymization and anonymisation toolkit	RSA, FORTH	TRUSTS innovation registry document	Data owners need to know the privacy risks in their data before sharing it. This is done by applying privacy metrics to the data to be shared. Afterward, the data owner may decide to apply anonymization measures to the data. In this toolkit, we provide both privacy metrics and anonymization methods.
4	Methodology	Metadata schema for data assets	RSA FG, SWC, FORTH, EMC	TRUSTS innovation registry document	A documented metadata schema building on top of existing schemas, such as DCMI schemas, for describing resources and datasets, but extended to data products. Metadata schemas are used for resources such as data sets. The schema developed in TRUSTS will specifically be designed to cover data assets in general, i.e., data sets as well as related applications or ML models.
5	Methodology	Protocol for metadata	RSA FG, SWC, FORTH, EMC	TRUSTS innovation	The protocol will be specifically designed for interoperability

		exchange		registry document	between a selected set of third-party data markets and initiatives of EOSC. If possible, it will be built on top of existing solutions such as OAI-PMH and ResourceSync and extend them
6	Product	A client-server application combining the metadata schema and the protocol for metadata exchange in a usable library	RSA FG, SWC, FORTH, EMC	TRUSTS innovation registry document	A module that can be integrated into a common data management platform (CKAN) which will enable the exchange of information about data products across a federated data markets network. An external data market should be able to integrate this software library with ease and be able to expose information about its data products to TRUSTS as a result. The library should also serve as a basis for connecting TRUSTS with EOSC.
7	Others	Registry of data markets (RoD)	RSA FG		This component will be essential for having an always up-to-date information about external data markets (metadata schemas, APIs, platforms) currently used in the sector. The information in the registry will assist in identifying the external parties most suitable for the testing/piloting of the TRUSTS developed interoperability solution.

3.3 Potential Business Models for TRUSTS

Based on insights from Task 7.1, the positioning of TRUSTS in Task 2.1, and the target market analysis on different customer segments, potential TRUSTS business models are explored. It is important to consider that data can be traded as a data commodity that is targeted at specific uses. For example, targeted data consultancy services for specific client needs. Data can equally be considered in terms of raw data that can be used by a client for future analysis and processes along the data value chain. Data can equally be considered as integrated in the forms of data-based objects that have simply been integrated. The proposed business model for TRUSTS must seek to ensure recognition of these different forms of data and to ensure irrespective of the focus on the type of data, and the value-added services must be provided. This means that potential business models require an effort of TRUSTS to ensure stakeholders are incentivised along the data value chain.

Potential business models for TRUSTS are considered below.

Business to Business (B2B). A potential business model for TRUSTS could be to focus on the exchange data between businesses. This implies that data collected across other platforms can be repackage and exchanged with businesses. However, because TRUSTS seeks to rely on a decentralised architecture it means that the data would not be stored by TRUSTS but within the infrastructure of the different organizations. In this regard TRUSTS would facilitate businesses that seek to exchange data. In added value TRUSTS would contribute for participating businesses in the ecosystem would be the provision of services. For example, TRUSTS can provide curated services to guide organizations in the processing of the data (e.g., aggregation of pre-curated data) and assist in services such as machine learning and algorithms to generate further insights. Irrespective of the services that are provided, it is important TRUSTS tries to provide services that are unique.

TRUSTS as platform-as-a-service (PAAS). In this model, combining both big data and small data processing approaches focuses on the transformation function of data goods and data services, that is, standardizing the data provided by data holders and then making it available to data users (Spiekermann, 2019). To have the sheer size of the platform in the EU, TRUSTS needs to offer more types of data than other platforms. Thus, more data holders are required. For data holders whose data contains more or less confidential business data, there is no incentive to continue providing data to TRUSTS if they cannot expect business benefits or other forms of compensation from TRUSTS (Can Azkan, 2020).

Business to Consumers (B2C): Based on the different customer segments and target market analysis, TRUSTS can also focus on consumers directly. This is important as data users are not necessarily big companies but also individuals who want a variety of data from multiple sources on the platform. An important consideration for TRUSTS in this regard is to ensure that the data is easy to use. This is because the technical skills of the consumers may vary from those that are technically savvy to those that have minimal technical skills. Accordingly additional services provided to users in this regard might be a crucial point that makes TRUSTS valuable. In the B2C Model, TRUSTS can provide the enabling environment that is safe, trusted and secured for individuals wishing to monetize their own data by selling it to the platforms. This data is not restricted to a specific segment of users. incentives schemes can be rewarded to the different customers based on the relevance of the data or the demand. For example, audience data which could be useful for advertisements in combination with location data might attract a higher reward, while data that has little value is provided at low price. However, it is important in this regard to ensure clear pricing strategies for data are put in place.

Business to Government (B2G): Another viable alternative based on the target market analysis, TRUSTS can also focus on the goal of linking businesses and government. TRUSTS could do so by providing a one stop shop for businesses that seek to leverage data from government services that are distributed.

3.4   Potential Outreach and Growth Strategy

TRUSTS outreach and growth strategy can be divided into multiple phases, ranging from the development to the commercialization phase. Currently, the focus will be on the development phase to show that TURSTS can reach the critical mass and, therefore, highlight that TRUSTS business models are future proof. The potential outreach and growth model can be seen in Figure 7 below. Three ways exist for expanding the consumer base. These are to target the growth in government agencies, company clusters, and trade associations. These tasks should be assigned to teams, each of which is accountable for an area or set of sectors. Their success should be evaluated using key performance indicators (KPIs) such as the number of newly joined organizations or prospective reached entrants.
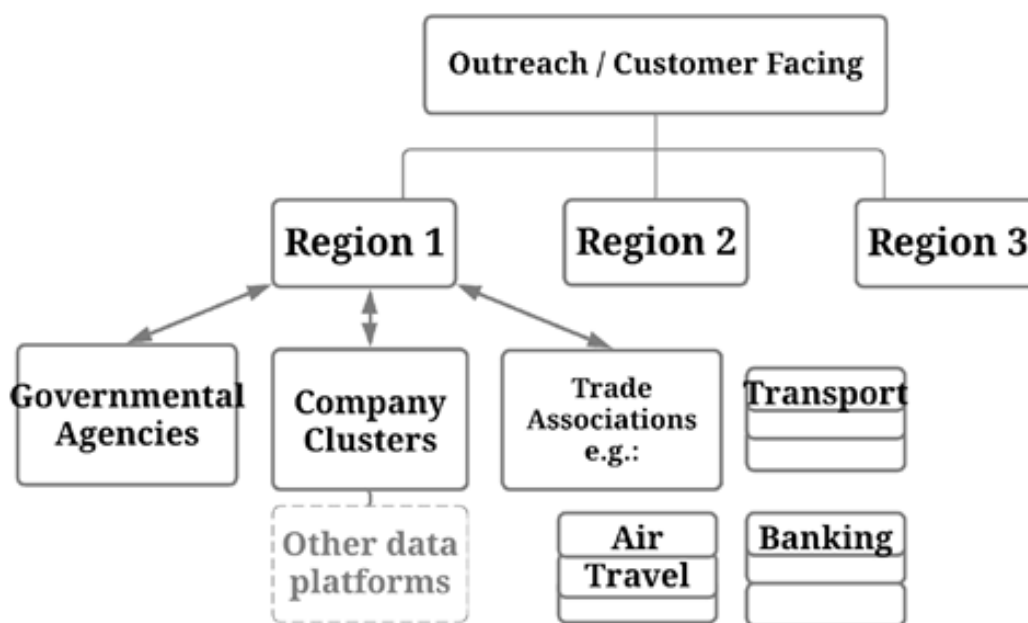
Figure 7 The potential outreach and growth model

The onboarding of government agencies (as members) will boost the TRUSTS data market's reputation and social standing. Government agencies have a high demand for data. For instance, the Food and Drug Administration (FDA) uses data science techniques to solve food-related diseases. Moreover, governments want to ensure that they share data with society in a secure manner and that companies create additional social value by analysing this data. Thus, the participation of government agencies will catalyse the development of TRUSTS. This vision is also in line with the potential business models stated

in the report *"D7.1 Sustainable Business Model for TRUSTS Data Marketplace I"* where governments and open data providers are primary TRUSTS target sectors.

Two other prominent targets are company clusters and trade associations. Examples of company clusters are existing data platforms, where many companies have already built their data sharing (and trading) networks in pilot projects. TRUSTS can approach these existing data platforms (Spiekermann, 2019) to integrate existing networks. Trade associations in the EU (see the examples here[10]) have extensive networks. Approaching the trade associations is essential to attract potential customers.

As shown in Figure 8 below, the company clusters and trade associations act as connectors in large social networks, and it is prudent to exploit this social capital. These organizations link many SMEs and sectors and recruiting them to TRUSTS is critical to unlocking the full potential of TRUSTS.
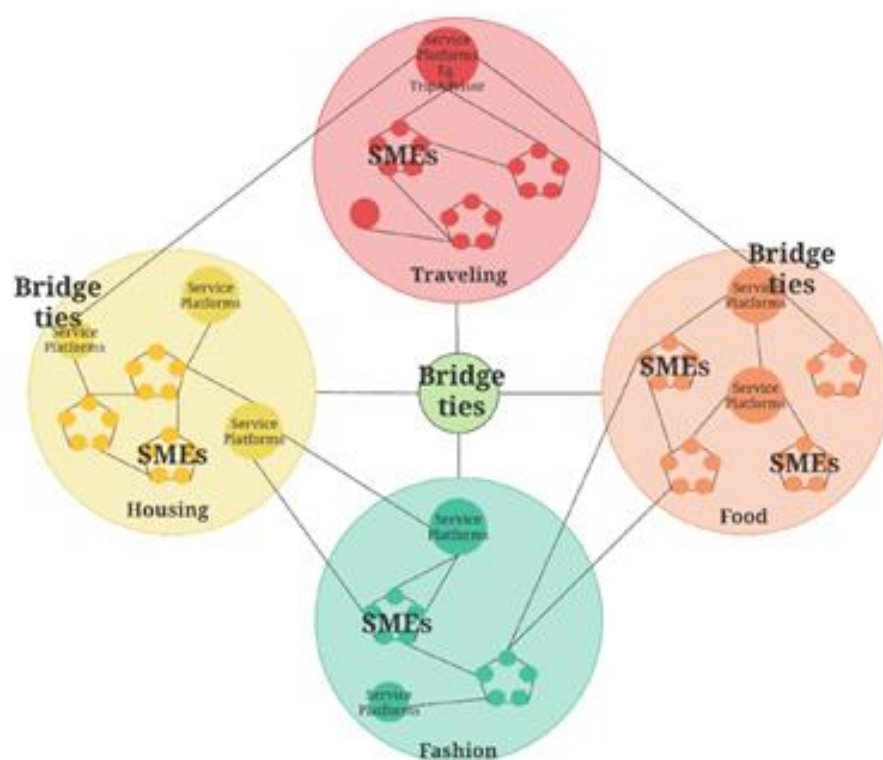
Figure 8 TRUSTS as a bridge tie between company cluster and trade associations

The outreach and growth teams should engage in the following activities:

- **Collaborate** with representatives of prospective user clustering governmental agencies, company clusters, and trade associates. Determine their specific needs and engage with them,
- **Demonstrate** profitable applications and use cases of the TRUSTS, and

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[10] http://www.aalep.eu/top-200-eu-trade-associations accessed on July 22, 2020

- **Integrate and educate** on how a company should modify its business processes (or required technologies) to use TRUSTS.

4 TRUSTS Potential Value Proposition and Services

TRUSTS aims to develop a secure, trustworthy, and GDPR compliant data sharing space which will benefit data producers and data consumers, acting as intermediary by connecting stakeholders, and as platform federator between data markets. Specifically, reflecting on Section 2.1, TRUSTS aims to fulfil three roles in the EU data economy. These are:

a) data marketplaces,

b) a federator, and

c) an ecosystem facilitator of data marketplaces.

TRUSTS potential value proposition, therefore, can be seen from these three perspectives. This value proposition is closely related to the D7.1 report "Sustainable Business Model for TRUSTS Data Marketplace I."

Generic value proposition

Regardless of its roles, the generic value propositions of TRUSTS are as follows (see section 4, "Emerging viable positioning options of TRUSTS within The Unified Taxonomy" in D7.1[11]):

1. TRUSTS ensures the **security, privacy, and sovereignty** of data trade while also guaranteeing **GDPR compliance and interoperability** amongst all involved parties. TRUSTS provides sovereignty features like anonymization, encryption, and smart contracts.

2. TRUSTS value creation is centred on **value chain coordination**, with a particular emphasis on data sharing, data trading, cooperation, and ecosystem access for ecosystem members. TRUSTS ecosystem is interoperable, providing data quality and a data exchange framework to exploit the value of own and shared data.

3. TRUSTS provides **key model and a set of components** to support digitalization and the deployment of data exploitation technologies in any domain of the economy and society (multisector) — see the concrete examples in Section 3.2 "The TRUSTS Potential KERs".

4. TRUSTS aligns with **reference positions and architectures** such as GAIA-X and IDSA.

5. TRUSTS establishes guidelines for **the provision of services** around the complete data cycle (capture, communication, protection, storage, processing, analysis, visualization).

6. TRUSTS provides **data catalogue** in which users of the TRUSTS Marketplace will be able to monetize and package datasets or files as Data Products and Application Services, as well as infrastructure and integration services.

7. Simplified ease of access (by a web interface) that incorporates (near) real-time access with ensured data quality.

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[11] https://www.trusts-data.eu/wp-content/uploads/2021/07/TRUSTS_D7.1_Sustainable-Business-Model_Taxonomies.pdf

Value proposition as a data marketplace

TRUSTS can potentially offer value-adding services to distinguish itself from the competitor by:

1. Providing **data cleansing services** to guarantee data quality.

2. **Aggregating datasets**, for instance, the option to harvest open (meta)data in order to supplement the existing data catalogue. This option will be beneficial to increase the volume and accessibility of datasets in TRUSTS.

3. **Offering consultation services** for data sale and acquisition. Currently, data marketplaces that offer personal assistance appear commercially viable compared to data marketplaces that merely provide data trading.

4. **Technical sales assistance** may provide a business potential since one of TRUSTS' target segments is MSMBs. Many of them are still in the early phases of digital transformation, which adds to the difficulty of enrolling them in TRUSTS. While standardised *connectors* will facilitate integration, extra assistance may be required for awareness development and education, internal data management, and setup, to mention a few.

5. A **secure data environment topic-oriented**, offering the possibility to train algorithms that need to be trained on real data while offering guarantees of **Intellectual property rights (IPR) protection** and ensuring that databases in these environments are accurate, also constitutes a crucial aspect for TRUSTS value proposition. Within experiments and testing phases for launching new artificial intelligence (AI)/machine learning (ML) services, such secure environments would exempt the enterprises that need data from the responsibility to prove that they have all the necessary security measures in accordance with the legal precepts. In this respect, TRUSTS should investigate the possibilities of becoming a certified platform through standardisation entities or certification bodies related to the field of data traffic.

TRUSTS value proposition as a federator of data marketplaces

A federated data marketplace offers many value proposition possibilities (see D7.1 and Abbas (2021)[12]):

1. By providing a **one-stop-shop** through a standardised portal, data providers and buyers from various data marketplaces can enhance their data discovery (and transaction) processes. The federation can forward the traffic from the one-stop-shop portal to the proper data markets in its simplest form. This may result in a decrease in both search and transaction costs.

2. Offering **commission-based brokerage services** to data buyers to find appropriate data assets.

3. Offering **shared services** for data marketplace operators, specifically in non-core services such as billing, user management. As a result, the operators can concentrate more intently on and improve their Unique Selling Propositions (USPs).

4. **Expanding the quantity (and quality)** of available datasets and solutions, as well as integrating meta-data from all onboarded data markets to increase the overall exposure of available datasets and solutions.

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[12] Abbas, A. E. (2021). Designing Data Governance Mechanisms for Data Marketplace Meta-Platforms. Proceedings 34th Bled eConference – Digital Support from Crisis to Progressive Change, online.

5. **Lowering advertisement cost.** Advertising exposure via meta-search engine has the potential to boost data market popularity. Additionally, collaboration may help reduce the expense of formal advertising.

6. **Coordinating and establishing standards** to harmonise the technological stack gradually. Especially for SMEs data markets, maintaining technology-stack and solve technological challenges trigger high expenses.

7. **Assuring compliance** with applicable laws, such as GDPR, in the data trading procedures inside this federated ecosystem.

8. By **establishing a single registry**, data providers and buyers can monitor the data trading code of conduct breaches.

TRUSTS value proposition as an ecosystem facilitator of data marketplaces

1. TRUSTS has the privilege of influencing the ecosystem's trajectory via **checks and presiding over essential problems** that may impact the ecosystem, such as restraining the powers or undesirable actions of specific partners.

2. Having the **facilitator and brokerage roles**, TRUSTS brings a wider audience to participate in the ecosystem. It will enable cross-fertilisation across different industry domains.

3. Set up **guidelines for components** to create data spaces per domain or value chain in which to extract value, favouring the creation of intelligent applications to help decision-making.

4. TRUSTS data market members can **grow their end-user numbers** by interacting and being interoperable with each other.

TRUSTS services

Referring to D7.1 (see the report for a detailed explanation), the current potential TRUSTS services is elaborate in the positioned business model taxonomies, especially in the meta dimension of value creation (See table 5). These services will be further analysed to update TRUSTS functional requirements.

Table 4 TRUSTS Positioning within the Unified taxonomy – value creation part

Meta		Dimension	Characteristics			
Value creation	**Ecosystem operator services**	**Onboarding mechanisms**	Framework-based	Algorithmic support		Consulting service
		Data pricing mechanisms	Set by data provider	Set by data buyer	Negotiated	Indicative Pricing Benchmarking
		Contracting support	DIY	Contract-based support		Smart contract engine

		Data quality measures	Self-declared		User reviews	
		Metadata quality measures	Self-declared	Quality check by an ecosystem operator	Quality check by a third party	
		Data service enabler	None	A proprietary stack of an ecosystem	An app store	
		Computing and storage infrastructure	Infrastructure provision		Infrastructure Brokerage	
		On-ecosystem analytics	None	Basic analytics	Sandbox environments	
		Data service validation	None	human-based	machine-based	
		Review system	Ecosystem operators	Data marketplace operators	End-users (e.g., data buyers)	Third parties (e.g., data brokers)
		Promotion (on the website)	Vendor profiles		Dataset showcases	
	Transaction processing	Contract	Standardised		Negotiated	
		Transaction execution	On-ecosystem (centralized)	On-ecosystem (decentralized)	Referred	
		Interfaces	Web-based interface	Standardised connector	Application Programming Interfaces (APIs)	

4.1 Competitive position of TRUSTS Against Similar Sector-Peers

As can be seen in Table 6, Porter's Five Forces[13] analysis is a business matrix that helps to analyse the level of competitiveness across a given industry. It is particularly suited when starting a new activity or when entering a new business sector. According to this framework, being competitive is not only about potential competitors, the level of competition in a sector depends on five basic forces: threat of new entrants, bargaining power of suppliers, bargaining power of buyers, threat of substitute products or services, and

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[13] Porter, M.E. (2008). The Five Competitive Forces That Shape Strategy. Harvard Business Review

existing industry rivalry. The collective strength of these forces determines the profit potential of an industry and thus its attractiveness.

Table 5 Porter's Five Forces Factors

Threat of new entrants	Bargaining power of suppliers	Bargaining power of buyers	Threat of substitute products or services	Existing industry rivalry
- Barriers to entry - Economies of scale - Brand loyalty - Capital requirements - Experience - Policies - Access to distribution - Switching costs	- Number of suppliers - Size of suppliers - Uniqueness of each supplier's product/service - Company's ability to substitute - Switching costs	- Number of customers - Size of each customer order - Differences between competitors - Price sensitivity - Buyer's ability to substitute - Buyer's information availability - Switching costs	- Number of substitute products/services available - Buyer propensity to substitute - Relative price performance of substitute - Perceived level of product differentiation - Switching costs	- Number of competitors - Diversity of competitors - Industry concentration - Industry growth - Quality differences - Brand loyalty - Barriers to exit - Switching costs

Porter's Five Forces focuses on competition, but when companies work together, they can create a much larger and more valuable market that they could achieve by working individually. Long-term business success comes not only from competing successfully within the current context, but also from being an active participant in shaping the market's future, changing the game to our own advantage. Competitors, customers, suppliers and complementors offer opportunities for cooperation, and this is the reason we are also considering **TRUSTS as a platform federator**, a federated ecosystem that enables the connection to multiple systems and platforms with TRUSTS integrated toolsets and services, for boosting data driven business opportunities. Section 7.2 provides more detail about this concept.

The different ways for TRUSTS to distinguish itself in front of competitors are:

- Offering **tailor-made services to specific sectors**, specialisation can generate a lot of satisfaction and create barriers to entry for new competitors.

- **Bundling services**: This model brings together a combination of several services into a single offer so that the services become more cost-effective, drive competitors out of the market and offer cross-selling opportunities.

- **Standard service**, offering the same service to all buyers, i.e., bank selling reports based on aggregated, anonymous data on the spending patterns of its customers. This service would allow affordable discounts and scale-sensitive margins.

5   Remuneration of partners

5.1   IPR claims foreseen

The exploitation plan is based on a detailed identification of the project's results. For each of the results identified, the project partners have reviewed their ownership claims both in background and foreground. The initial claims brought to the project and subject to intellectual protection (IP) can be found in the Consortium Agreement (CA). Together with the background knowledge from the research and development activities are to be monitored during the project implementation and will be the basis for the exploitation agreements.

A goal of the TRUSTS project is the conception of a future TRUSTS OpCo (or finding an alternative operating company). For the operation of a future TRUSTS platform, both the technical, legal and administrative aspects for the operation need to be clarified. This report deals with the technical and some legal aspects, how IPR of the users of the TRUSTS platform can be protected and what concepts exist for this, what steps have already been taken for implementation and what will still be necessary in the future.

For the establishment and operation of the future TRUSTS OpCo, it will be important especially towards the end of the TRUSTS project at the latest, to obtain clarity about the rights of use of the software components developed during the project. This is because the question of the use of the developed software has a direct impact on the business model and the possibilities of using the software components at all or even economically. It is therefore essential to deal with this topic in the second half of the project: *Under what conditions are the consortium partners of the TRUSTS project willing to bring in their software in the future TRUSTS platform?*

The type of license to use and the level of user fees have a direct impact on the profitability of the future operating company (TRUSTS OpCo).

- If the licenses / prices for using components are too high, this could reduce the margins that can be achieved from a data transaction with market participants for the TRUSTS OpCo.
- If prices are too low, the owner of the software components and its developer may not be able to operate or develop further the components economically.

Both variants would be more than disadvantageous for a sustainable operation of the future TRUSTS platform and TRUSTS OpCo.

In order to transfer the TRUSTS platform developed in the TRUSTS project into sustainable operation by the TRUSTS OpCo, it is necessary to clarify the rights of using software components in each case at an early stage and to establish a contract amongst the TRUSTS consortia partners that enables the future TRUSTS OpCo to ensure economically viable operation of the TRUSTS platform. To this end, the interests of the parties involved must be taken into account and a well-balanced (contractual) solution found.

In research projects, a mixture of different types of rights of use can always be found. Some rights remain with the consortium partner who developed the software beforehand and now contributes it to the project and develops it further through the funding. In this case, the rights to the software usually remain with the contributing organization. On the other hand, the funding institutions take the view that things developed with publicly funded money and their rights of use then also belong to the public.

This is a structural conflict of interest. This potential conflict should be addressed in the second half of the project (M18-M36) in order to find a viable solution for the later TRUSTS OpCo before the end of the TRUSTS project.

From today's perspective, two things should be regulated in the planned agreement within the TRUSTS consortium:

1. Use of the consortium partners' software IPR by the future TRUSTS OpCo.
2. Further development and support of the TRUSTS software modules by the consortium partners.

Use of the consortium partners' software IPR by the future TRUSTS OpCo.

The following is a suggestion of how the process of establishing a balanced contractual agreement within the consortium could look like. The objective is to develop a balanced agreement for the use of the consortium partners' software IPR by TRUSTS OpCo.

Proposed steps are:

a. **Agreement on the process:** the consortium adopts the procedure proposed here for establishing a sustainable agreement and adopts a procedure model.
b. **Identification of the software components used:** first, an overview and list of all open source and proprietary software components used will be compiled. Each consortium partner will enter the software components it uses in a common catalogue in a form yet to be chosen.
c. **Software-technical requirements profile of the TRUSTS platform ("must-have", "good-to-have", "nice-to-have"):** after determining which types of software are to be used under which license, a software-technical requirements profile of the planned TRUSTS platform will be drawn up. A distinction should be made as to which components are necessary for the basic operation of the platform ("must have"), which could be included as a useful addition ("good to have") and which components are rather optional ("nice to have").
d. **License overview:** The next step is to look at the licenses used for the software modules with regard to overlapping, complementing and/or contradicting each other. Modern software often contains numerous open-source software components with different license rights - and it is therefore important to get an overview of the license types used. It is suggested to use the methodology and analysis tools from the Austrian research project DALICC (Data Licenses Clearance Center under the lead of University of Applied Science, St. Pölten, Austria, www.dalicc.net) and to analyze the licenses found in the previous step in the way tested and established in the DALICC project.
e. **License specifications:** after identifying and describing the license types used, a specification of the possible future license use is drawn up - especially for proprietary licenses (such as: pay-per-use, open-access, research, business and so on).
f. **Comparison with the intended business model:** the next step is to find out what impact the selection of one of the discussed business models will have on the intended selection of software components (are they all needed in this way or perhaps additional apps/services?)
g. **Drafting a framework agreement for software use:** in parallel to the above steps, a framework agreement is drafted that regulates the future software use by TRUSTS OpCo and the consortium members (and possibly other providers).

    h. **Negotiation for software use by TRUSTS OpCo:** Negotiation and drafting of an agreement with each individual rights holder regarding the future use and maintenance of the software components used in the TRUSTS platform.

    i. **Conclusion of the TRUSTS agreement on IPR use by TRUSTS OpCo: finally**, the signing of a sustainable agreement by the entire TRUSTS consortium is sought.

Further development and support of the TRUSTS software modules by the consortium partners.

Similar to the above proposed process (of agreeing on the future use of the software components necessary for operating the TRUSTS platform) there need to be a sustainable agreement of the TRUSTS consortium on the issue of support, maintenance, and further development of the software components.

    a. A**greement on the process:** in the consortium, the procedure proposed here for establishing a sustainable agreement is accepted and a procedure model is adopted.

    b. **Development needs of the software components used:** starting from the software components selected above, the presumed development needs will be collected and estimated. Each consortium partner will enter the planning for the further development of the software components in a common catalogue in a form still to be chosen.

    c. **Software-technical development roadmap of the TRUSTS platform ("must-have", "good-to-have", "nice-to-have"):** after ascertaining which software components should be further developed when and how, a software-technical development roadmap of the planned TRUSTS platform will be drawn up. The aim is to distinguish which components must be further developed for the basic operation of the platform ("must have"), which could be useful additions ("good to have") and which developments are rather optional ("nice to have").

    d. **Development overview:** A TRUSTS software development plan is then drawn up, listing the planned or sensible development steps with a horizon of perhaps 2-3 years.

    e. **Support and maintenance specifications:** after the TRUSTS software development plan has been drawn up, the support and maintenance efforts are specified and elicited.

    f. **Drafting of a framework agreement on support, maintenance, and development:** in parallel to the above steps, a framework agreement will be drafted to govern future software development / support / maintenance by TRUSTS OpCo and the consortium members (and other providers, if applicable).

    g. **Negotiation of future expenses by TRUSTS OpCo or consortium partners:** Negotiation and drafting of an agreement with each individual rights holder regarding support, maintenance and further development of the software components used in the future TRUSTS platform.

    h. **Conclusion of the TRUSTS agreement for the further development of the TRUSTS components:** finally, the signing of a sustainable agreement of the entire TRUSTS consortium is aimed for.

These two processes will be a focus of the work up until the end of the TRUSTS project. The successful implementation of these processes will provide TRUSTS OpCo with the necessary planning certainty for the establishment and operation of the future TRUSTS platform.

5.2 Asset's owners and operators' remuneration

TRUSTS focus is to create a business and commercial plan to define a series of actions that enable data governance models and other framework conditions facilitating the emergence of the data platform, allowing companies and individuals to avoid the negative externalities of proprietary industrial platforms (supply-driven approach, lower level of control on proprietary data, centralized data governance and technical architecture). For TRUSTS to become successful, a wide range of domain actors (including third party developers, suppliers, and users) should be encouraged to join the platform and build applications and services that run on them.

To remunerate the actors within the marketplace, must take into consideration the forms in which the monetization can be:

- Selling the data or products derived from the data

- Using external data internally to generate value: Adding another dataset to your own business data to create better insights or new work stream

To this aim, legal aspects related to data transfer and data use, as well as implications emerging from data ownership and control and close cooperation with international standardization bodies, should be considered to reduce barriers and risks and encourage more users to embrace the data platform model.

Licences allow individuals to know, without ambiguity, the uses to which data may be put in case of re-use and the conditions they will have to consider in terms of intellectual property.

In some cases, these licences may be developed by teams of legal experts within the institution. However, there are licences for open data and other products that have already been developed and can be freely used by anyone.

For datasets:

The widely popular Creative Commons (CC) licences offer a series of alternatives that allow individuals and organisations to grant permissions on the use of their datasets, whatever they may be. CC licences allow those who create a certain product (in this case, a dataset) to retain the intellectual rights over it, without preventing copying, distribution, or some forms of use.

These licences have three layers:

- The traditional layer known as the Legal Code, which specifies the conditions governing the use of what is made available.

- The layer that summarises the legal information in a common language, known as the Human Readable layer.

- The Machine-Readable layer, which contains the summary of the legal information in a format that can be read by computer systems and other forms of technology.

In order to establish the type of licence to be used, there are two issues to be resolved: first, whether commercial use of the data will be permitted and, second, whether any adaptations that may be made based on the material being made available are permitted.

CC-BY-ND: Work released under this license can be re-distributed but cannot be changed

CC-BY-NC: Work released under this license cannot be used commercially

CC-BY-NC-SA: The content cannot be used for commercial purposes. Modifications should follow the same license

For applications and services:

For software there are five types of common license models. Four of them are open source (which allow to reuse code to some extent), and one disallows any reuse whatsoever.

1. **Public domain** is the most permissive model and means that anyone can modify and use the software without any restrictions.

2. **Permissive licenses** have minimal requirements about how the software can be modified or redistributed. The most common and popular with free open-source software are **Apache** style or **BSD** style, which cannot be used for commercial purposes and their modifications should follow the same license. Another common variant is the **MIT** License, which also cannot be used commercially.

3. **Copyleft**, also known as reciprocal licenses or restrictive licenses, allow to modify the code and distribute new works based on it, always if the requirements for redistribution under the same license are met. Some copyleft licenses allow to release the modified code only, others require the release of the entire application under the same license. One of the most common restrictive licenses is the General Public License, **GPL**, work released under this license can be re-distributed but cannot be changed. A similar one is Affero General License **AGPL and** becoming more popular.

4. **The GNU Lesser General Public License**, LGPL allows linking open-source libraries, and facilitates the release of the new application under any new license (even a proprietary), when a code is compiled or linked with an LGPL library.

5. Of all types of licenses, the most restrictive is the **proprietary**, in which all the rights are reserved, and it is mostly used when the work may not be modified or redistributed.

6 Remuneration of partners

TRUSTS aims at implementing and operating a fully operational data marketplace. In this section the Consortium partners aim at identifying the TRUSTS service cost structure.

A cost structure means the types and relative proportions of fixed and variable costs incurred by the business. The concept can be explained in smaller units, such as by-product, service, customer, product line, etc.

The cost structure explains all costs incurred to make a business model functional. Such costs can be computed after determining key:

- Resources,
- Activities, and
- Partnerships

One needs to identify every cost incurred in relation to the TRUSTS service to define the cost structure.

The fixed costs are the costs of those items that remain the same irrespective of the volume of services (datasets, application transactions, etc.). On the other hand, the variable costs are such costs which vary in proportion to the volume of goods or services.

The key elements of the cost structures are as follows:

1. **Product cost structure**
   a. *Fixed costs:* Direct labour and overheads, etc.
   b. *Variable costs: C*ommissions, etc.
2. **Customer cost structure**
   a. *Fixed costs:* Administrative overheads for customer[14] service, marketing, sales, advertisement, legal, support, etc.
   b. *Variable costs:* Costs of services sold to the customer, etc.
3. **Operations cost structure**
   a. *Fixed costs:* Administrative overheads, licences, office rental, training, etc.
   b. *Variable costs: Other than product s*taff wages, platform maintenance, etc.

Note: Certain costs can be tough to define. So, one may need to complete an activity-based costing outline, to closely assign costs to the cost structure of the given cost object. Nevertheless, such a high-level analysis is adequate to identify the key TRUSTS operational costs elements. Besides the analysis above the capital expenditure elements will need to be identified.

In the table below, the TRUSTS cost structure is described:

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[14] https://cleartax.in/g/terms/customer
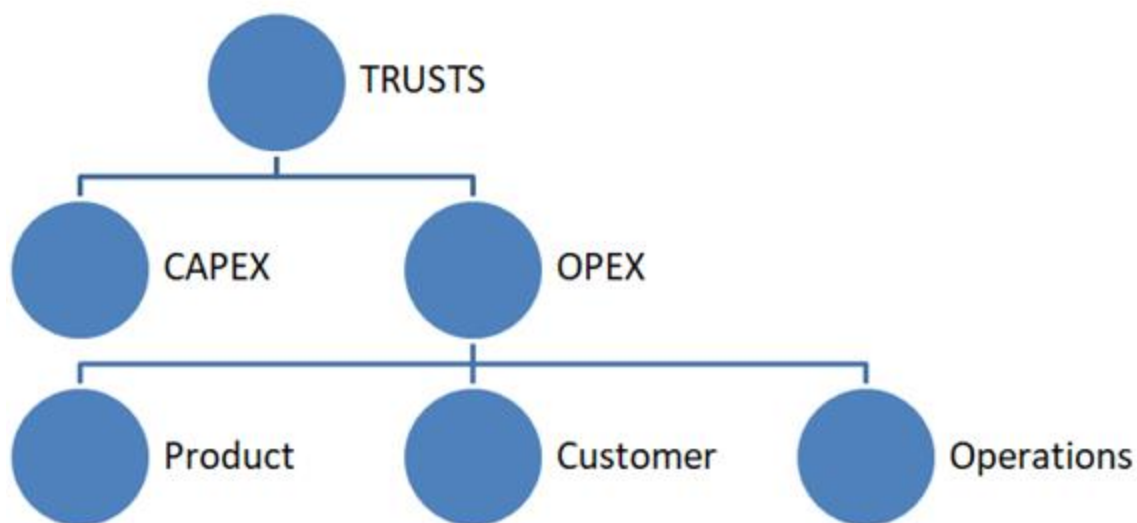
Figure 9 TRUSTS cost structure

Table 6 offers the description of the cost elements per category defined above, in order to be considered at the remuneration and cost model development phase in the next version of this report, D7.8.

Table 6 CAPEX cost elements

CAPEX cost elements	Description
Business initiation costs	Costs to set up TRUSTS legal entity
Final TRUSTS project platform	Initial setup and usage cost of the components used in the platform
Transforming TRUSTS to a commercial service	Investment to transform the platform to a commercial service reaching TRL 9
Operations setup	Rental, initial advertisement, initial agreements, quality/security inspection and certificates, hiring expenses, etc.
Other	To be specified in future version of this document

Table 7 OPEX cost elements

OPEX cost elements	Description
Product	
Dataset's trade	Commission costs, quality/security inspection costs, smart contract, onboarding, and introduction to catalogue process, etc.
Applications trade	Commission costs, quality/security inspection costs, smart contract, onboarding, and introduction to catalogue process, etc.
Federation	Peering costs, smart contract costs, etc.
Value adds	Indicatively customised services, consultancy, etc. costs.
Customer	
Private user	Marketing, advertisement, contact centre, help desk, etc. costs.
Corporate user (private, government, academia, etc.)	Marketing, advertisement, contact centre, help desk, integration, onboarding, etc. costs.
Federated marketplace	Usage costs
Operations	
BSS & OSS processes and staff	Staff wages, etc.
Hosting and real estate	Monthly costs of rental, hosting, business continuity costs
Platform maintenance	Maintenance of platform components and other systems costs

Value adds costs (recommender system, portal content, dispute resolution based on logs analysis, etc.)	Staff wages and consultancy/content acquisition costs
Compliance and certification costs	Costs to maintain quality, security, compliance, etc. Audit, certificates, and respective internal processes costs are included as well.
Financial costs	Payment systems costs, bad dept, financial reporting and auditing costs, etc.

7 Commercialisation alternatives

In the TRUSTS ecosystem all actors (data demander, data creator, service provider and market makers) need to consider the value of data in order to ensure a fair and sustainable marketplace for every involved party. Estimating the value of data and setting the right price for a data product offering is a key challenge. For vendors, the pricing is part of the value-creation with data. For customers, wrong pricing makes data unattractive. While overviews of the pricing of software products exist, there is no consolidated overview of the state-of-the-art for pricing data products.

The quality attributes in the data impacting the pricing model are stated in table 8 below:

Table 8 Quality attributes

Time	Data may need to be updated because it gets incorrect/obsolete over time
	A price may be defined depending on how the data is refreshed/updated
Accuracy	Aggregation/anonymisation for being GDPR compliant may deteriorate the data quality
	Potential deviations of the data and its consistency from the true values
Completeness	Parts of the data may be missing
	Incompleteness may impact the value of the data and thus its price

For the TRUSTS ecosystem, trust, innovation, and scalability represent the most crucial factors affecting the economic viability of the platform. To be successful, TRUSTS should create value by facilitating convenient and efficient transactions. Nevertheless, it is crucial that the platform is appealing to both data providers and data demanders, as without them, transactions are obviously impossible.

7.1 Commercialisation strategies

Task 7.5 aims to address commercialisation in a coherent manner throughout the project and to support the beneficiaries in eliciting and coordinating their commercialization strategies, thus increasing the chances for the results of the project to become, through the appropriate commercialisation measures, innovations that can provide tangible benefits, satisfy specific needs, and wants.

TRUSTS commercialisation strategy must take into consideration:

- The elicit key exploitable results of the project, intending them as concrete items that can survive and be used after the project ends
- The added value identified and the potential boosting of further scientific developments

- The market potential, barriers, the target end-users, and potential competitors

- The partners' exploitation strategies. In general, their strategies can be classified into three categories:

  ❏ **New research:** when the results are intended to be used for publications and to be involved in new research projects and activities

  ❏ **Commercial exploitation:** when the partner intends to propose the adoption of the result according to a market-oriented strategy, based on offering a new service or a new product on the market

  ❏ **Standard setting**: when the partner intends to propose the adoption of the result as a standard

  ❏ **Internal adoption:** when the partner plans to use the results internally to improve the knowledge within its own organisation or to improve internal procedures

TRUSTS goal is to help accelerate customers' business through the TRUSTS ecosystem, and a possible formula could be to subsidise certain platform services in order to encourage key players to enter the ecosystem.

In order to start the process of commercialisation, it is crucial to list and to define the catalogue of solutions and datasets: detailing type and category. Datasets and services must be organised by category/industry and easy to filter making it easy for customers to find the right data or services.

Commercialisation alternatives for the TRUSTS platform are listed in the figure 10 below:

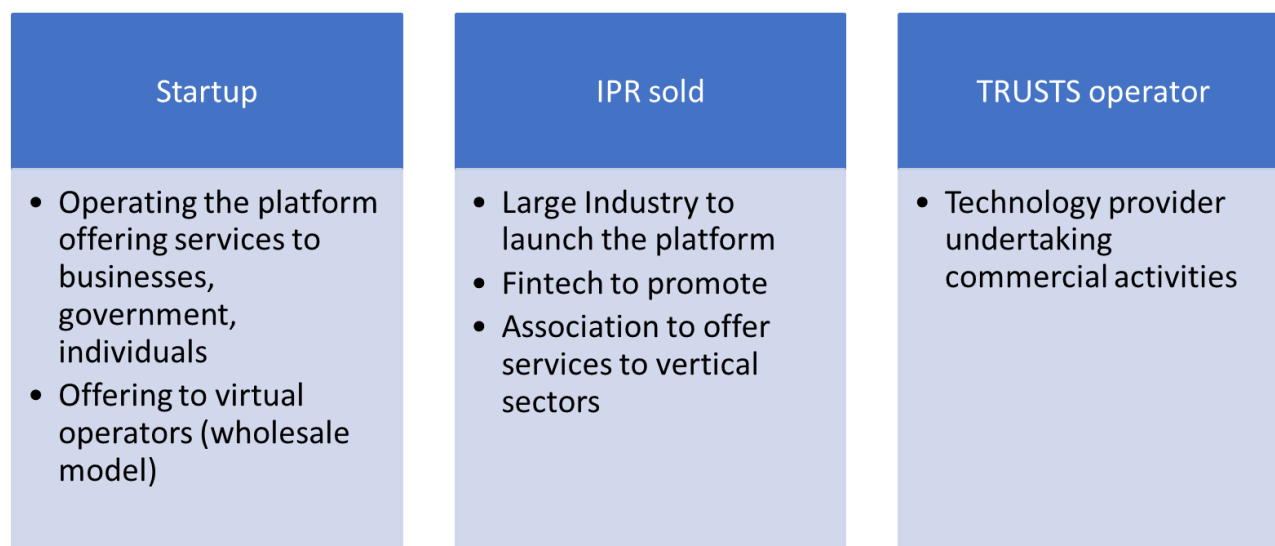| Startup	IPR sold	TRUSTS operator
• Operating the platform offering services to businesses, government, individuals • Offering to virtual operators (wholesale model)	• Large Industry to launch the platform • Fintech to promote • Association to offer services to vertical sectors	• Technology provider undertaking commercial activities

Figure 10 Commercialisation alternatives

TRUSTS aims at setting up:

- a fully operational and GDPR-compliant European data marketplace for personal related data and nonpersonal related data **[the product]**
- targeting both personal and industrial use **[the market]**
- by leveraging existing data marketplaces (International Data Space and Data Market Austria) and enriching them with new functionalities and services **[the services]**

Despite various initiatives at setting up data marketplace platforms, interoperable pan-European industry platforms are still missing. Existing data marketplaces often offer non-commercial data (e.g., open government, satellite, and weather data).

Designing sustainable business models for data marketplace platforms is challenging for multiple reasons:

1. First, finding appropriate pricing models is challenging because of the Arrow's paradox: it only becomes clear what information is worth once the information has been disclosed (Pantellis, 2013)
2. Second, defining proper service models is challenging.
3. Third, issues of accountability and quality of data need to be handled in scalable and automated ways, allowing smart contracts that go beyond standard service level agreements.

According to the work programme, the main reasons for the limited use of data are:

1. technical barriers (such as interoperability and data standardisation),
2. cost (for curation and infrastructure), and
3. legal uncertainty (data ownership and data protection requirements).

TRUSTS aims at providing an innovative yet robust data and related applications trading environment able to federate the data exchange ecosystem and offer value add business services.

TRUSTS, in parallel to the implementations, defines a commercialization strategy to be able to deploy respective initiative following the completion of the project. As a first step to the strategy, we try to identify the available commercialization options so at to explore the pros and cons of each path. For the case of forming a **start-up** with the scope to operate a profitable TRUSTS environment.

The following commercialization options are under investigation:

A. Form a start-up with the scope to operate a profitable TRUSTS environment (supplementary Venture Capital funds could be sought as well). Three operational models can be investigated:
    1. Operating the platform offering services to businesses, government, and individuals
    2. Operating a platform able to accommodate virtual (OTT) data marketplace operators (wholesale model)
    3. A combination of the above

B. Collectively sell the TRUSTS IPRs to an enterprise that is willing to undertake TRUSTS operation e.g.:
    1. Industry to launch an enterprise centric operation
    2. Fintech to promote combined data/industrial and investment products

3. Association to offer services to member (vertical marketplace, facilitating E2E manufacturing process, etc.). In particular, the project partner Data Intelligence Offensive (DIO) incepted during the DMA project and having to date more than 150 member organizations could benefit from utilizing the TRUSTS data market platform as a service for its members, in lieu of the original Data Market Austria (DMA) which did not turn operational.

4. Other

C. Form a start-up acting as technology provider supporting the TRUSTS operator which will mainly undertake the commercial activities (e.g., An association). Services should be provided based on SLA.

D. Combination of A, B & C

7.2 Platform federation: an alternative commercialisation

"Growth is never by mere chance; it is the result of forces working together." – James Cash Penney, the founder of J.C. Penney.

Growing in the business world requires ingenuity, a focus on core business strategy i.e., operate an end-to-end (E2E) quality data marketplace and become a market leader in federation.

Key elements of business expansion are:

● Seek New Distribution Channels
  ○ Advancements in technology and distribution are the constant drivers of market expansion. They consistently generate new distribution channels.
● Bring a New Product to the Market
  ○ TRUSTS envisage initiating operations providing successful services. The next step will be to grow market reach with new value add services capitalising on technological, innovation and market trends.
● Broaden enterprise appeal
  ○ Expand your market reach by broadening TRUSTS appeal. Countries and continents are diverse, so TRUSTS should take advantage of that by marketing services to diverse groups.
● Strengthen TRUSTS Brand
  ○ Strengthen TRUSTS brand to make it more visible and expand market reach.

TRUSTS strategy is to provide quality services and increase market reach both organically and through federation.

Organic growth involves:

● Onboard a substantial number of quality and diverse data being able to be traded through the platform

● Onboard a considerable number of data management applications

● Acquire a large number of corporate clients of various sectors

● Provide services to a significant number of private users

Following a successful implementation of the activities TRUSTS will become a significant market player offering services to a large clientele volume. Such market positioning and stature will eventually become an asset towards expanding market reach.

This may be achieved in an inorganic way exchanging clientele and market reach through federation. Significant marketplaces will seek federation in order to capitalise on each other's ability to reach, understand the needs and serve local markets. It is evident that the bigger TRUSTS become the more other players will seek federation with TRUSTS. In addition, a significant market positioning by TRUSTS will assist the commissions' negotiation process with third marketplaces.

7.3   Revenue drivers

The revenue sources and drivers for TRUSTS are based on:

- the different types of data management and trade services
- data management applications offering
- insights and innovation of data exchange
- market statute

To this end the envisaged services and revenue sources are analysed in the following table 9.

Table 9 Services and revenue sources envisaged for TRUSTS

Revenue drivers	Description
Services to data providers	Integrity and quality inspection, introduction to catalogue, etc.
Services to application providers	Security and quality inspection, introduction to catalogue, etc.
Services to corporate clientele	Setup fees, monthly subscriptions, value add services e.g., consultancy, reporting, balk transactions usage, etc.
Services to private users	Pay per use
Federation	Commissions per transaction, year-end bonus, etc.

Value add services	Indicative value-add services may include cleaning data services, consultancy, training, transaction insurance, hosting and operation of vertical data marketplaces, customised services to individuals, businesses, or closed user groups, etc.

7.4   Revenues models

The most common revenue models are **transactional**, where customers pay a **fixed price per unit** of the product or service; for example, one euro for a kilo of tomatoes at the supermarket or a litre of milk. Transactional revenues can also incorporate fixed fees and quantity discounts.

A different type of revenue model is a **subscription model**, whereby customers pay a fixed fee per unit of time and in return receive a fixed number of units of product or service, e.g., a newspaper every day, or unlimited usage during the subscription period such as a monthly gym membership.

Another revenue model, typically used for intellectual property, is the assignment of rights, whereby the customer pays a **royalty or assignment fee** that allows them to use, sell or copy the product for a fixed period (unlimited if the assignment is perpetual), within limits that are determined by geography, the nature of the product, and so on. For example, software is always sold on a perpetual assignment basis and the owner of a patent may license the use of its technology to other companies for a fee.

Companies often have multiple revenue streams, where different customers pay according to different formulas or revenue models, or hybrid revenue streams, where payments from a given customer are combined into different revenue models. For example, in the eBay marketplace, sellers pay a subscription fee if they "rent" an eBay online shop, an auction fee, and a fee for each transaction that has been closed on the platform. These fees vary according to the nature of the auction or transaction, the product category, and the price format, but they can be averaged. We can therefore account for recurring revenue as the sum of the amount of subscriptions, the auction fee, and the transaction fee, where each of these in turn has different drivers.

Other revenue models are:

Peer-to-peer: Through this model, individuals exchange products or services directly with each other. The matchmaking and exchange may be facilitated by an intermediary. The Internet has turned this revenue model into a viable system by making the transactions more accessible, quicker, and safer. Customers and providers do not need a firm that owns all the means of production and labour to perform the whole production process, and on the other hand, they benefit from companies that operate as intermediary firms, in order to connect both sides of the market.

The intermediary acts as a matchmaker in the middle of the two sides, the one who has something to offer and the others who can benefit from the offer. This system usually involves a platform that facilitates the contact between both sides, establishing the rules and legislation, payment systems and setting up the process that may be necessary for the transaction to occur.

Some examples of this peer-to-peer business model are Uber, or Airbnb.

Bartering: It is a way of avoiding the use of cash in the company, a business approach that more and more companies are starting to use. Bartering is "the action or system of exchanging goods or services without the use of money".

The Latin term, quid pro quo, "something for something" is the original definition of bartering that does not involve bargaining or price negotiation. Bartering is when two parties offer to exchange with each other exactly what they want at a similar value and quality. It is an accepted way of doing business.

For centuries, traders, countries and even kings have traded goods to get what they needed or wanted. In today's economy, with an ever-evolving digital universe, exchanging goods and services with another company or individual is a vital means of commerce, as is evident from its advantages:

It can be an effective way to introduce any company's products and/or services to new customers. It allows the utilisation of unused capacity or downtime of a company that would otherwise be wasted. Using barter, almost any type of business owners can exchange their excess inventory that might otherwise stagnate. Service providers can barter during slower periods of their year. Their excess time, inventory and capacity can be turned into profits while reducing some cash expenses.

It helps the business improve cash flow management. Instead of the owner spending money to buy some goods and services, he can trade to obtain them.

In our case, bartering would be done through TRUSTS as a specialised platform that gives members credits for each item or service they contribute. Members could use the credits to pay for goods or services offered by other club members. Finding a barter partner on your own can be difficult and TRUSTS could simplify the process.

Cross-selling: It is done when a product or service that complements the customer's existing purchase is recommended by the seller. It is supposed to provide additional value to customers, while understanding what customers value most and then respond with products and services that truly meet those needs. This strategy is intended to increase revenues, by predicting cross-sell opportunities. For example, if we are contracting a bank account, we will be offered a credit card.

Regarding this specific model, TRUSTS platform could implement AI models to provide recommendations offering new datasets or services to a given customer, according to their attributes, predicting their interest.

8   Pricing models

A pricing model can be defined as a set of the rules established for determining prices, and it describes how products, services, and variables of the context are considered to achieve objectives of interest, as for example profit maximization.

Digital markets for trading data are emerging, but there is no consolidated understanding of how to establish a price for data products and, on the way, provide incentives for data sellers to share their data. Research on pricing data products is still in its infancy.

8.1   Methods of pricing

Each revenue stream may have different pricing mechanisms, combining different types of buyers and sellers. There are two main types of pricing mechanism, fixed and dynamic prices.

In the **fixed-price system**, the price remains constant because the raw material value and the processes vary very little. The concepts to consider for this system are:

- List pricing: The price established by the product or service owner or the service provider
- Product feature dependent: When the price depends on the quantity or quality of the value proposition to be trade
- Customer segment dependent: Each customer segment has allocated a particular price according to their characteristics
- Volume dependent: The price varies with the volume to be purchased. The higher the quantity purchased, the lower the resulting unit price.

For what regards the **dynamic price system**, the price evolves according to the market conditions:

- Negotiation: The price is determined between the parties, and the result depends very much on who has more negotiating power
- Real-time market: In this case, the law of supply and demand is what prevails. The price fluctuates based on how many customers want to acquire and how much is available for sale.
- Auctioning: The final price depends on the perception of value that customers have for the product or service. It may involve initial bidding and competition among buyers.
- Yield management: It is a variable pricing strategy based on the inventory and the moment of purchase. The same product or service can be sold to two different customers for entirely different prices, because of the number of variables impacting the process. This strategy takes a data-driven approach to ensuring pricing is adjusted in order to maximise business results from an inventory.

The TRUSTS pricing models to be considered are listed in the below table 11.

Table 10 Pricing models for TRUSTS

Single requests	Time-based subscription
Pay per use	Unrestricted use
Pay per unit	Subscription fees
Query or view based	Flat rate
Customer type price	-

The **single requests pricing models** offer customers a wide selection of offers so that they choose only the one they actually use. This model provides a higher margin than subscriptions.

On the other hand, through the **Subscription model** the customer pays a periodic fee for unlimited access to a service for a certain period. This model ensures predictable revenue and facilitates cross-selling. This tends to create a stronger and longer lasting relationship than the Pay per Use model.

Customer profile, the data usage, customer bids and the cost side of data provision will have to be taken into consideration, and a special role plays quality of the data, and the uniqueness of the data.

At the first stage of commercialisation, TRUSTS will have to combine several pricing strategies, based on the complexity of the dealing with the data, the uniqueness and robustness of the data, and the costs affecting the price to sell that data to its customers.

Two strategies to be combined are penetration pricing and freemium pricing. The objective of a **penetration pricing strategy** would be to attract customers through low prices, thinking on the long-term benefits of the increased actors. Low prices would expand network effects, and the increase of the network externality can strengthen the added value of the TRUSTS platform. With the **freemium pricing strategy**, TRUSTS would provide free service as a lower-quality service, while trying to expand the network externally. Free data available on one's marketplace can help to attract customers, which in turn attracts holders of commercial data (Muschalle et al., 2013). It would then be when customers would be retained with more services and higher quality services. In addition, free data could be combined with other data and services, and these would result in much more valuable data or services. This strategy would allow enabling or disabling features depending on the user's needs and budget, which may be used to create an upgrade path from a "lite" version to "standard", "pro", "enterprise" et versions without modifying the existing version of the platform.

9 Conclusions and Next Actions

Despite various local initiatives at setting up data marketplace platforms, interoperable pan-European industry platforms are still missing. Existing data marketplaces often offer non-commercial data (e.g., open government, satellite, and weather data).

Designing sustainable business models for data marketplace platforms is challenging for multiple reasons:
- First, **finding appropriate pricing models is challenging** because of the Arrow's paradox: it only becomes clear what information is worth once the information has been disclosed (Pantellis, 2013)
- Second, **defining proper service models is challenging**.
- Third, issues of **accountability and quality of data need to be handled in scalable and automated ways, allowing smart contracts that go beyond standard service level agreements**.

The main reasons for the limited use of data are:

1. technical barriers (such as interoperability and data standardisation),
2. cost (for curation and infrastructure), and
3. legal uncertainty (data ownership and data protection requirements).

Data exchange brings perception of risks to ownership, confidentiality, quality, and privacy that are consequently jeopardising any marketplace, the lack of trust and security is a significant barrier to data exchange. Among the challenges posed by the digital economy, TRUSTS must ensure the security and safety of the environment by design, TRUSTS infrastructure, components, key messages to be launched to the market, branding and visual identity should reinforce the safety and security aspects of the platform and build a reputation.

Another consideration impacting TRUSTS sustainability are the standardization aspects because standards applicable to data markets are still not clearly defined, and the future of the data markets growth depends on technological standards allowing data interchange.

On the other hand, key factors for the commercialisation of the TRUSTS platform are the user acceptance and the willingness to pay for the data itself. It is known that some data markets have not succeeded in recent years, showing the limitations of data trade and data interchange. Data holders still have few incentives to sell their data, they are not considering the potential monetisation of these datasets, the demand from data users is uncertain ahead of time, and the low willingness to pay for data is a challenge to overcome.

This document is to be considered preliminary, as it reflects the plans that the partners have at the current stage of the project. A completed and more detailed version of the business models will be released at the end of the project, together with the cost analysis and the final business strategy as "D7.8 Business plan and Implementation action plan II".

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