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Safe-DEED

www.safe-deed.eu

D2.3 Business model decision support tool

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Changes Summary

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Executive summary

Within the present deliverable, we provide the result of the development process of supporting tools to enable business managers to develop data-driven Business Models by applying Safe-DEED technologies. The report outlines the development, the application and the evaluation of three tools and their integration (online availability) at the Business Makeover platform.

As a starting point in the business model innovation process, we present the Safe-DEED Data Map. The Data Map is a visual supporting tool to identify possible data sources with a specific focus on data which are potentially utilisable with Safe-DEED technologies. Next, we describe the Safe-DEED Data Service Cards which can be used as inspiration and creativity support in the ideation phase of a data-driven innovation. Building on this, the Safe-DEED Data Driven Business Canvas can be used to develop ideas into use cases including financial considerations. Finally, we demonstrate the availability (online and free of charge) of the three tools on the business model innovation platform "Business Makeover". Since the platform has already a high user bases from all over the world (focus on EU countries and USA) the provision of the Safe-DEED business model tools on the platform is a valuable occasion for promotion of Safe-DEED project results.

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1 Introduction

The purpose of Task 2.2 is twofold. On the one hand to design and evaluate business models (BMs) for the developed Safe-DEED technologies which are described in detail in D2.2. On the other hand to design and evaluate supporting tools for the development of data-driven BMs by applying Safe-DEED technologies. These tools should enable business managers to develop data-driven privacy-preserving business models. The present D2.3 outlines the development and application of three tools and their integration in the business model platform "Business Makeover" (www.businessmakeover.eu) where the tools are available online and free of charge.

To generate concrete business value from data, the knowledge of how a data-driven service is developed must be built up in companies. A lack of structured value proposition design and a limited understanding of customer needs are challenges in developing data-driven services. Another challenge is the necessary collaboration of different disciplines e.g. data scientists, domain experts and business people. So far few tools are available which facilitate the creativity and co-creation process amongst teams with different backgrounds in the development process of data-driven business models.

To develop suitable BM supporting tools for Safe-DEED technologies we examined 1) data-driven BMs in general, 2) the advances of Safe-DEED technologies for data-driven BM (see D2.2) and 3) existing types of tools and methods for developing BMs.

1) Based on recent research results a data-driven business model consists of the following main characteristics (Fruhwirth et al., 2020):

- Data is used as a key resource
- Data analytics methods are used as key activities to create value
- Data or information is part of the value proposition and can be monetized

2) Safe-DEED technologies have the potential to create direct value (improvement of privacy, information of data value) and also indirect value (increase willingness to share data). This results in two important interactions between data-driven BMs and Safe-DEED.

- Safe-DEED technologies lead to increased availability of datasets, thus enabling data users to implement data-driven BMs
- Data users will only use data marketplaces and/or pay for datasets if they derive value from the data, hence data-driven BMs are conditional for any viable BM of Safe-DEED technologies

3) Several different types of tools and methods are available that support the BM innovation process in general (Fruhwirth et al., 2020):

- Visual representations – support understanding, design and analysis of BMs (Osterwalder & Pigneur, 2010)
- Business Model Pattern – describes recurring configurations of BM elements aiming to support the idea generation and evaluation of BMs (Gassmann et al., 2013)
- Software Tools – enable users to digitally represent and adapt BMs (Szopinsky et al., 2019)

Based on the previous considerations three data-driven BM tools have been developed within Task 2.2 and are presented in this deliverable. As a starting point in the business model innovation process, we present in Section 2 the **Safe-DEED Data Map**. The Data Map is a visual supporting tool to identify possible data sources with a specific focus on data which are potentially utilisable with Safe-DEED technologies. Next, we describe the **Safe-DEED Data Service Cards** (Section 3) which can be used as inspiration and creativity support in the ideation phase of a data-driven innovation. Building on this the **Safe-DEED Data-Driven Business Canvas** (Section 4) can be used to develop ideas into use cases including financial considerations. Finally, we demonstrate the availability (online and free of charge) of the three tools on the business model innovation platform www.businessmakeover.eu.

2 Safe-DEED Data Map

The availability of data sources (internal, external, existing, new) and advances in privacy-preserving technologies (e.g. anonymization, multi-party computation) and artificial intelligence opens up massive business opportunities. Since data is the central resource in a data-driven Business Model we designed a visual collaboration tool to identify possible data sources for developing new data-driven services.

2.1 Development

The main aim of the Safe-DEED Data Map is to establish a common understanding of available data in a company concerning Safe-DEED technologies. Our starting point was the Data Canvas approach from Mathis & Koehler (2016) which is structured along two dimensions 1) the origin and 2) the refresh rate of the data (see Figure 1).

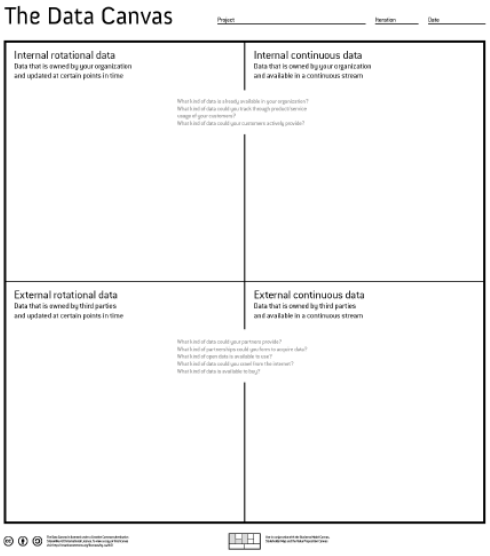

Figure 1: Data Map approach of Mathis & Koehler (2016)

The first version of the Safe-DEED Data Map (see Figure 2) was presented and discussed in the Safe-DEED project meeting in May 2019. The main idea was to put emphasis on the origin of the data. For Safe-DEED technologies the quadrant at the bottom right is the most relevant one focussing on data from data market places and data providers. In a workshop setting led by WP2 team, the consortium partner tested the tool and provided valuable feedback for further developments.

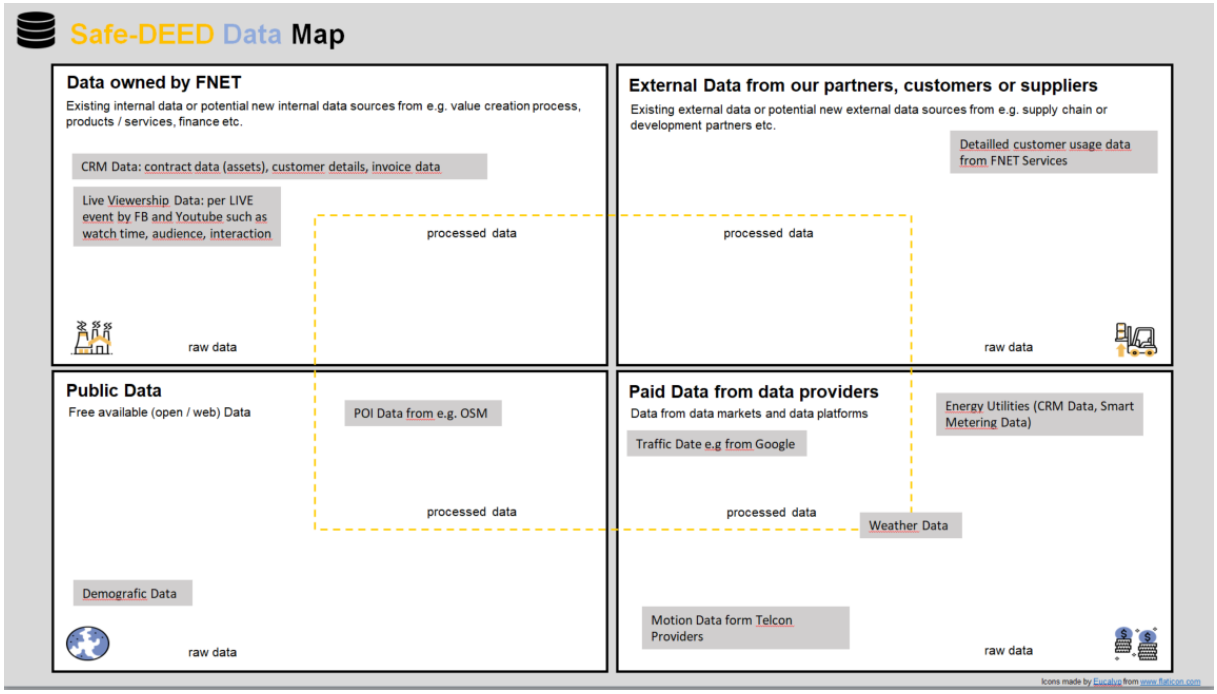

Figure 2: Safe-DEED Data Map version 1.0

Based on further evaluations of the first version of the Safe-DEED Data Map in combination with insights out of the Safe-DEED business model workshop held in Graz (November 2019) the corner stones of the final version were defined. The relevant structuring pillars for the Safe-DEED Data Map are:

- Data ownership – Who owns the data?
- Usage rights – Who is allowed to use the data and in what form?
- Willingness to share – Are the data creators/owners willing to share their data?

Taking these pillars into account the WP2 partners developed the present version of the Safe-DEED Data Map which are depicted in Figure 3 and described in detail below. The results of the Data Map can be further processed as input in the Safe-DEED Data-Driven Business Canvas (see Section 4). The Data Map can be used as a printout or in form of the online editable pdf version.

2.2 Description of the tool

The Safe-DEED Data Map aims to identify possible data sources that can be utilised to develop new data-driven services. To facilitate and structure the search for potential data sources, we have divided the data map into four quadrants. The four quadrants vary mainly in terms of ownership and usage rights of the data. It can be used either to create a general data inventory or to search for specific data for a future data service.

1st Quadrant: Data owned by company

Here we are looking for internal or potentially new internal data sources available in our own company e.g. process data from production or provision of services, financial data or sales data. Since the ownership of this data is clear, its use should be possible without hesitation provided that the GDPR requirements are complied with.

2nd Quadrant: Data created in collaboration with a 2nd party

The second quadrant (right-top) is intended for data created in collaboration with a 2nd party (customer, supplier etc.) This could be data generated through product/service usage (car, social media), data collected by order of a company or data created within supply chain processes. For this kind of data, the ownership and usage rights need to be checked and defined.

3rd Quadrant: 3rd party data provider

The bottom left quadrant is reserved for data from 3rd party data provider e.g. free available data mostly provided by government websites or by open (research) data platforms. There also exist several data market platforms where a broad range of data can be bought. Usually, the ownership and usage rights of this data are clearly defined.

4th Quadrant: Data created and owned by a 2nd party

In the downright quadrant, we look for data which are only be utilised by application of privacy-preserving technologies developed in Safe-DEED project (e.g. anonymization, multi-party computation). These data are created and owned by a 2nd party (data from companies of other industries and branches or even competitors) where we usually have no data access and the willingness to share is questionable. If this data can be utilised the usage rights need to be negotiated.

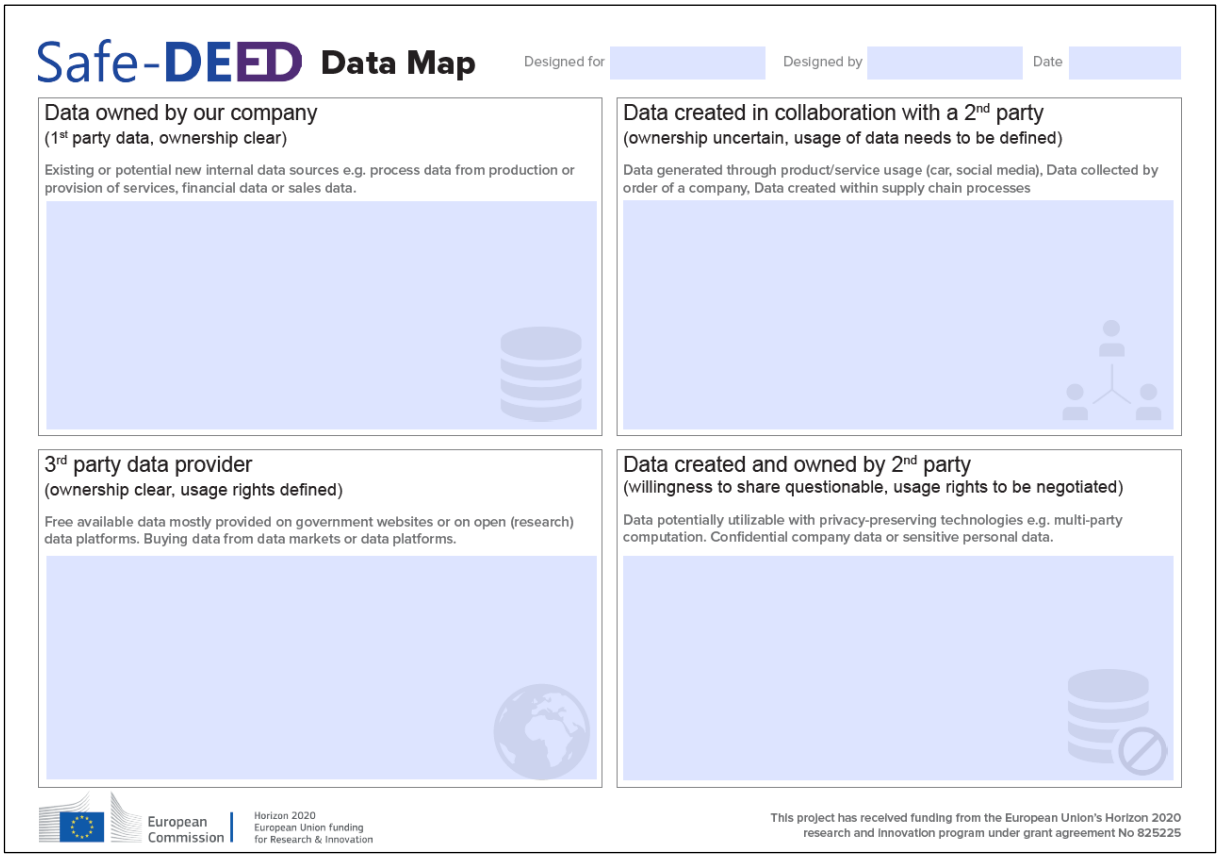

Figure 3: Safe-DEED Data Map pdf Form version

How to use the tool:

In general, the Data Map can be used individually but are most effective if used by an interdisciplinary team consisting of people e.g. from IT, Business Development or Sales and Finance departments. We would recommend using a large print of the Data Map to use in a brainstorming session and start with the first quadrant (top left). Use sticky notes to easily move and change inputs. Since the tool is also available as a pdf form (template), it is also possible to fill the canvas out collaboratively in e.g. a video conference.

2.3 Evaluation

During the development phase of the data map, it was continuously evaluated and the evaluation results were incorporated into the next versions. Some versions were also applied and evaluated by the Know-Center in customer projects in 2019 and 2020. Furthermore, we evaluated the Data Map by applying an analytics uses case (sales and production forecast) for bakeries. The filled-out Data Map for this use case is presented in Figure 4.

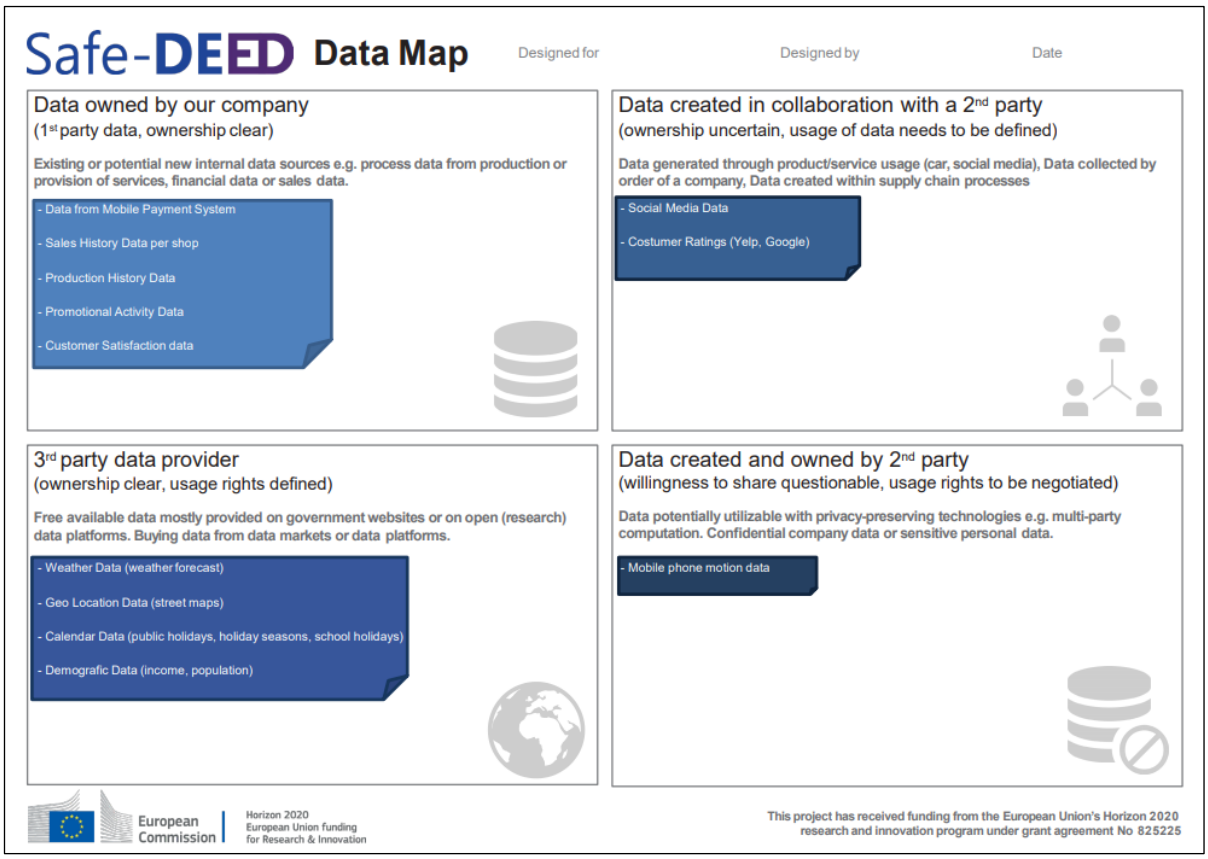

Figure 4: Safe-DEED Data Map evaluation example

3 Safe-DEED Data Service Cards

The Safe-DEED Data Service Cards (DSC) aim to enhance or develop new data-based services through the systematic combination of data sources, analysis methods, customer benefits and revenue opportunities. The present 50 Data Service Cards can be used as inspiration in the development process of data-driven innovations. As an extension, the Data Service Cards can be used in combination with the Safe-DEED Data Driven Business Canvas described in Section 4.

3.1 Development

Cards are an especially adequate tool at the very beginning of an innovation process when the focus lies on generating as many solutions as possible and the main obstacle is lack of inspiration. Research has shown that the haptic aspect of cards stimulates the creative process (Gassmann et al., 2013, Kwiatowska et al., 2014, Sanders et al 2010, Hornecker 2010). Albeit it is not only the tangible,

physical aspects of cards that stimulate inspiration and creativity; It is also the way cards are designed with respect to their content such as pictures, text and other information such as visible categorisation or examples (Breitfuss et al., 2020)

The development of the Data Service Cards is based on an analysis of 122 data-driven product/service ideas collected in the course of data analytics projects at the Know-Center in the years of 2018 and 2019. Through a qualitative content analysis, the 122 documented ideas were classified according to four main categories that adequately describe a data-driven use case (Fruhwirth et al., 2020): Data Sources, Data Analytics, Data Service and Benefits. In order to take the business aspect into account, a fifths category was added, namely "Revenue Models".

Figure 5: Front side of main category cards

Using a cluster analysis, the respective sub-categories (10 cards per category) were derived and subsequently, the research team developed the corresponding contents. Each card (front and backside) contains an explanatory picture (frontside), an explanation text (top of backside) and an application example (lower backside)

3.2 Description of the tool

The Data Service Cards deck consists of two introduction cards (see Figure 6), one explanation card for the respective category (see Figure 5) and 10 cards per category.

Figure 6: Introduction Cards

Data Sources: In this category, you will find 10 selected data sources that can be individually distinguished between internal & external and existing & new data sources. Tip: Start by identifying internally available data sources.

Figure 7: Example Data Sources Card

Data Analytics: Data analytics enable you to gain new insights from data to deliver added value to customers. The applied analytics methods depend on the amount and quality of the data to be analysed. In this category, you will find 10 data analytics methods. Tip: Take sufficient time to select the appropriate analytics method for each data source. We recommend focusing on the generated benefits for customers or their own organisation.

Figure 8: Example Data Analytics Card

Data Service: The data service describes how the added value from the data is made available to customers. Depending on the desired benefit, different forms of provision of the data services are suitable. In this category, you will find 10 well-known examples that you can use as inspiration for developing your individual data-driven service. Several services or combinations can be developed from most data sources. Ultimately, the customer's perspective decides which service is perceived as particularly useful.

Figure 9: Example Data Service Card

Benefit: The customer benefit describes the added value generated by the provision of the data service. In this category, you will find 10 examples of customer benefits based on data-driven services. Since the customer benefit is derived from the customer needs, we recommend identifying customer pains and gains beforehand.

Figure 10: Example Benefit Card

Revenue Models: The 10 revenue model cards should inspire what pricing strategy is suitable for your data service. Besides the well-known models like subscription and freemium, check out also possible alternatives like indirect monetisation or paying with data.

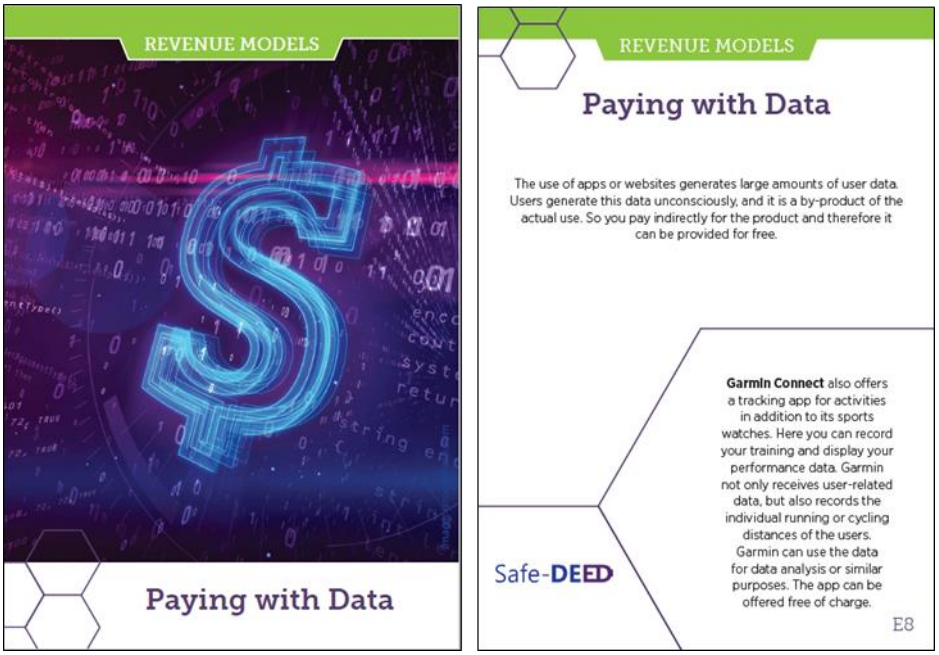

Figure 11: Example Revenue Models Card

How to use the tool:

In general, the Data Service Cards can be used individually but are most effective if used by an interdisciplinary team consisting of people e.g. from IT, Business Development or Sales and Finance departments. The card deck can be applied in the following ways.

Develop a new data service (group of 4-6 people)

- Place category explanation cards on the table ordered by 1) Data Source, 2) Data Analytics, 3) Data Service, 4) Benefit and 5) Revenue Models or use a print out of the Data Driven Business Canvas.
- Discuss all cards per category in the group and select a maximum of 3 cards per category. Two sequences have proven to be promising.
    - Start with 1) Data Sources → 2) → 3) → 4) → 5)
    - Start with 4) Benefits → 3) → 2) → 1) → 5)
- Discuss the developed data service and check the consistency.

Further development of an existing service (group of 4-6 people)

- Place category explanation cards on the table ordered by 1) Data Source, 2) Analytics, 3)Data Product, 4) Customer Benefit and 5) Financial Implications or use a print out of the Data Driven Business Canvas
- Try to rebuild your existing service based on the 50 cards
- Discuss all cards per category (order does not matter) whether it makes sense to consider the card about additional customer benefits
- Discuss the developed data service and check the consistency

3.3 Evaluation

The first evaluation of the Data Service Cards was carried out in the course of an idea generation workshop for data-driven products/services organised by Know-Center and a partner cluster organisation. 18 representatives from different companies of the green-tech industry were invited to test the Data Service Cards in a half-day (4 hours) workshop. The participants were divided equally among 3 groups. Each group was supervised by one researcher. After a short introduction into data-driven business, the Data Service Cards were explained using commonly known data services (see Figure 12). Subsequently, the 3 groups were requested to perform 3 different tasks by using the DSC. First feedback from the participants shows that the DSC are well understood and perceived as helpful. The layout and design of the cards were also highlighted as positive.

Figure 12: Reconstruction of Netflix with Data Service Cards

It was planned to do a large application and evaluation of the Data Service Cards as part of the Safe-DEED Business Workshop at the Bled Conference in July 2020. Due to COVID pandemic, this Workshop could unfortunately not be held. Therefore we are currently preparing virtual and online ways for further evaluation of the Data Service Cards in the remaining duration of the project.

4 Safe-DEED Data-Driven Business Canvas

The Safe-DEED Data-Driven Business Canvas is a visual collaboration tool that intends to support the process of developing a data-driven Business Model. The present canvas particularly considers the development process of a structured value proposition, the identification of customer benefits and the assessment of financial aspects. Furthermore, the canvas aims to support the necessary interdisciplinary communication in the innovation process of data-driven services.

4.1 Development

The Safe-DEED Data-Driven Business Canvas is based on the "Data Product Canvas" developed by Fruhwirth et al. (2020) outlined in Figure 13. In the course of the project activities in WP2 and intensive discussions in the workshops held in Barcelona and Graz various adaption variants were developed. Main focus was to take into account the business value of the enabling technologies developed by Safe-DEED project.

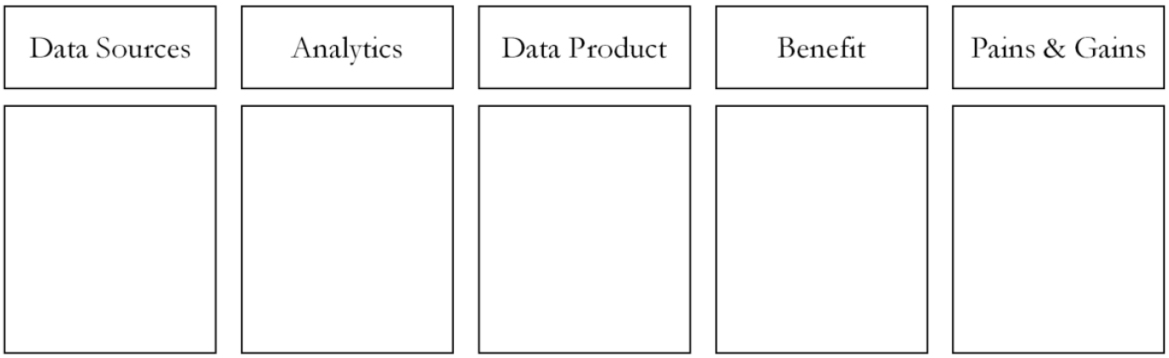

Figure 13: Schematic representation to the Data Product Canvas by Fruhwirth et al. (2020)

The first version of the Safe-DEED Data-Driven Business Canvas is shown in Figure 14. The main changes compared to the Data Product Canvas are the exchange of the part "Pains & Gains" by "Financial Implications". After some initial tests with the Safe-DEED use cases of WP6 and collected feedback in terms of usability and user experience we further developed the canvas to the current version depicted in Figure 15.

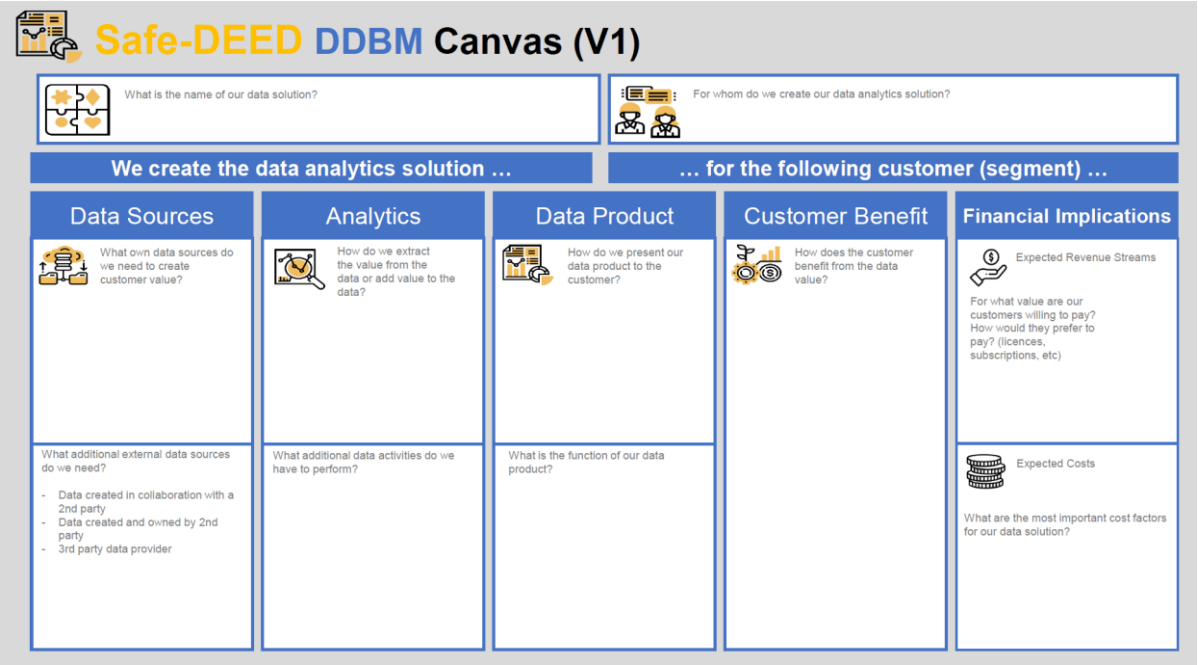

Figure 14: Initial version of the Safe-DEED Data Driven Business Canvas

The present version of the canvas can be used as a printout or in form of the online editable pdf version. In addition, the canvas can also be used in conjunction with the Date Map and Data Services Cards (main categories of the canvas corresponds to the Data Service Cards categories).

4.2 Description of the Tool

The Safe-DEED Data Driven Business Canvas helps you to develop a data-driven service innovation. The present Canvas consists of five main sections. The data sources (which could be transferred from Safe-DEED Data Map), the needed analytics methods (e.g. regression analysis, classification or privacy-preserving methods) to process the data, the data product - representation of the service (e.g. dashboard, report etc.), the intended customer benefit and lastly the financial implications in terms of expected revenues and costs.

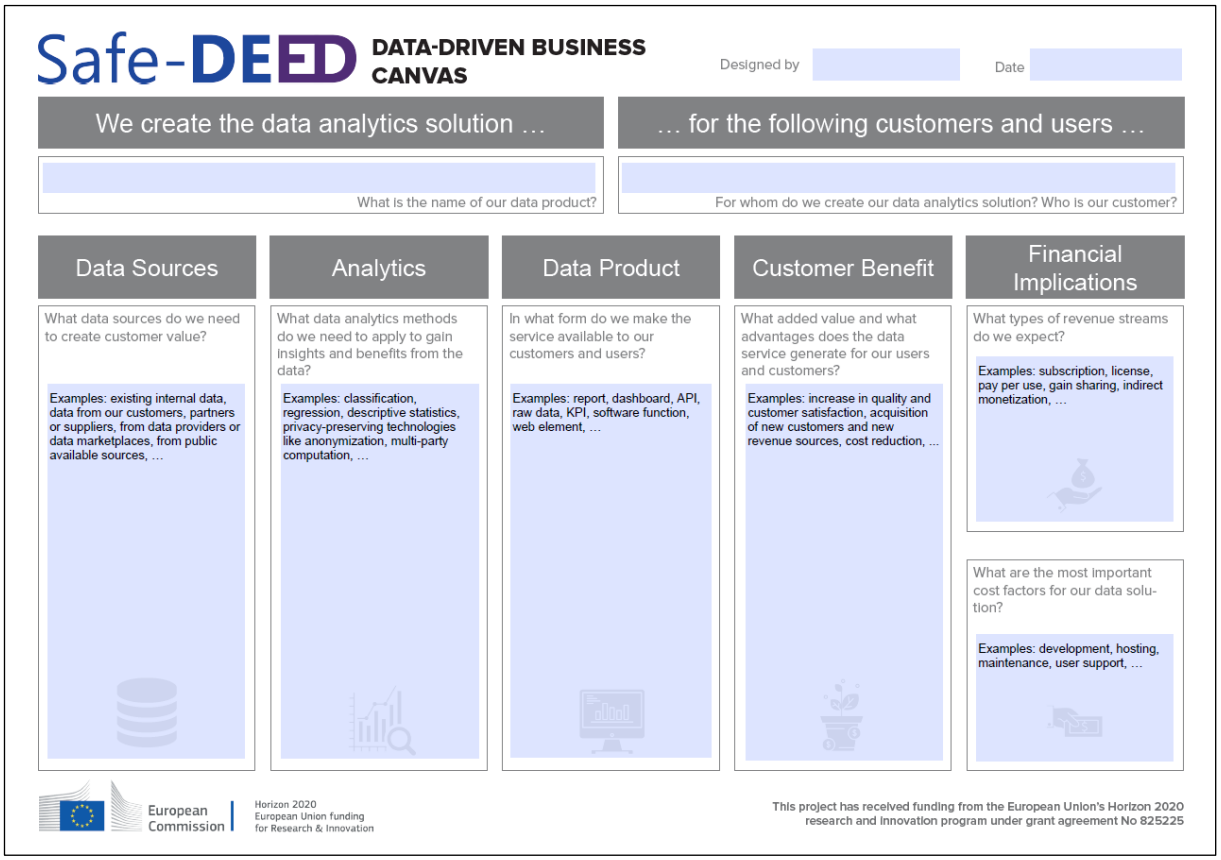

Figure 15: Safe-DEED DDB Canvas pdf form version

The Data Driven Business Canvas consists of five main sections. The data sources (which could be transferred from Safe-DEED Data Map), the needed analytics methods (e.g. regression analysis, classification or privacy-preserving methods) to process the data, the data product - representation of the service (e.g. dashboard, report etc.), the intended customer benefit and lastly the financial implications in terms of expected revenues and costs.

How to use the tool:

In general, the Data-Driven Business Canvas can be used individually but is most effective if used by an interdisciplinary team consisting of people e.g. from IT, Business Development or Sales and Finance departments. We would recommend using a large print of the Data Driven Business Canvas for use in a brainstorming session. Use sticky notes to easily move and change inputs. Since the tool is also available as a pdf form (template), it is also possible to fill the canvas out collaboratively in e.g. a video conference.

Basically, it does not matter in which order the different columns of the canvas are filled out. In practice, however, three promising variants have been identified to develop a data service by using the canvas.

Start with Data: That means start filling out the canvas from left to right. First, check out what data sources are available (internal, external, existing, new). The Safe-DEED Data Map could be used to

assist in this part. After that, try to find out what analytics method you could apply to gain insights and benefits from the data. In the next step think of possible ways to make the service available for the customers and users. Then, most importantly, try to identify a concrete customer from the offered service. Finally, check out financial implications in terms of expected revenues and costs.

Start with Customer Benefits (Needs): In this variant, start filling out the canvas with column "Customer Benefit". It is important to look closely at customer needs and the added value for the customer. Then work through the canvas to the right via Data Product and Analytics until the Data Sources which are needed for the desired data service. Finally, check out Financial Implications in terms of expected revenues and costs.

Start with an already existing service: Starting point in this variant is the central column "Data Product" where existing service should be briefly described. Hereafter, add improvement ideas for the existing service. Next, think of the Customer Benefits that can be achieved with the improved service. Then check out the suitable Analytics methods and needed Data Sources. Lastly, as usual, consider financial implications in terms of expected revenues and costs.

4.3 Evaluation

The evaluation of the Data-Driven Business Canvas was carried out using the WP6 use cases. A detailed description of the WP6 use case application can be found in D2.2 section 4 (Business Models for Safe-DEED Use Cases). Furthermore, we evaluated the canvas by applying a data-based sales and production forecast for bakeries. The data analytics company Meteolytix evaluates weather data and weather independent influencing factors for calculating a sales forecast per store and product. Through a combination of various data sources and application of advanced data analytics methods, valuable benefits for the bakery are created. The filled-out canvas for this evaluation use case is presented in Figure 16.

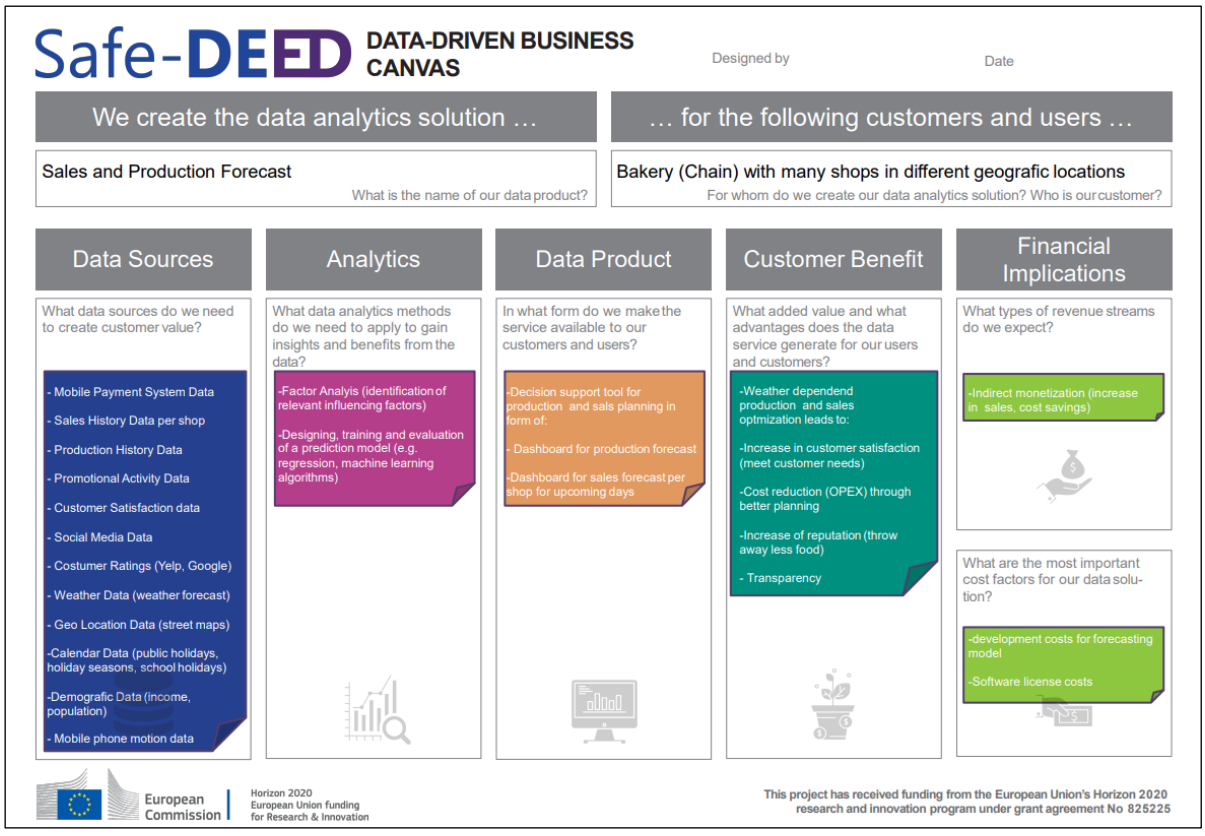

Figure 16: Safe-DEED DDB Canvas evaluation example

5 Public/Online Availability of Tools

To make the developed tools best possible available to a large audience the WP2 team decided to cooperate with the Business Makeover (BMO) platform (www.businessmakeover.eu). The Business Makeover platform is the result of 4 years of research (H2020 project "Envision") into business model tooling and how it is used by entrepreneurs of small and medium-sized businesses, family businesses and female entrepreneurs. This platform aims to support SMEs in an easy to use way to develop, evaluate and plan new business models. The provided business model tools including the new Safe-DEED tools are freely available.

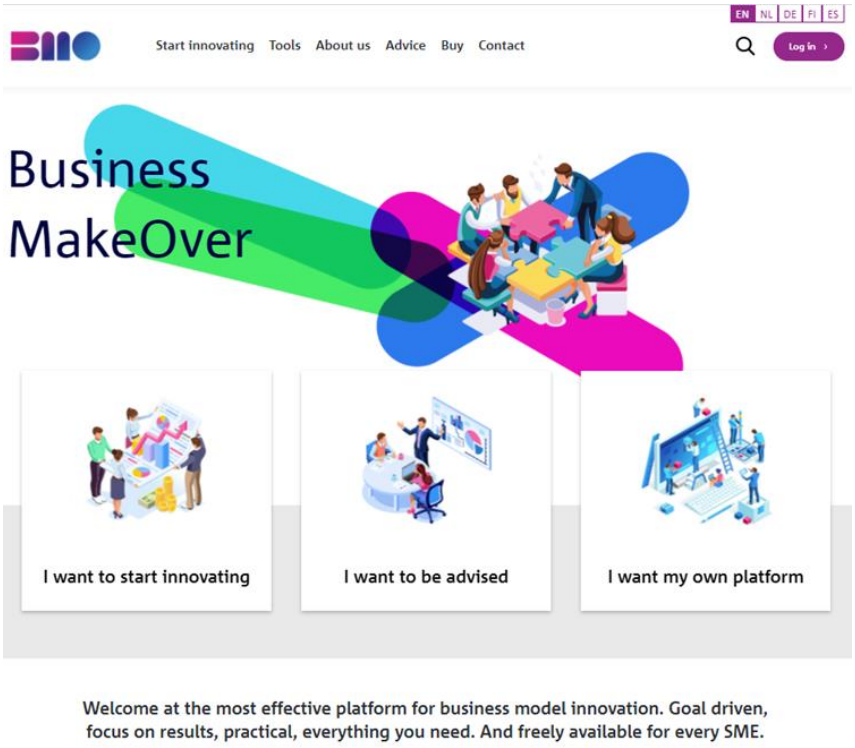

Figure 17: Starting page of Business Makeover platform

The three developed Safe-DEED data-driven business supporting tools are available on the tool section of the platform https://businessmakeover.eu/tools. By clicking on the tool icon (see Figure 18) you can access a detailed description or download the pdf version of the tool explanation directly. The Safe-DEED tools can also be reached by direct links

Data Map: https://businessmakeover.eu/tools/safe-deed-data-map
Data Service Cards: https://businessmakeover.eu/tools/safe-deed-data-service-cards
DDB Canvas: https://businessmakeover.eu/tools/safe-deed-data-driven-business-canvas

For each tool the following information are available (see Figure 19):

- Short summary of the tool
- An indication on required time, complexity and target group
- Two different download variants of the tools
- A described example
- How to use instructions

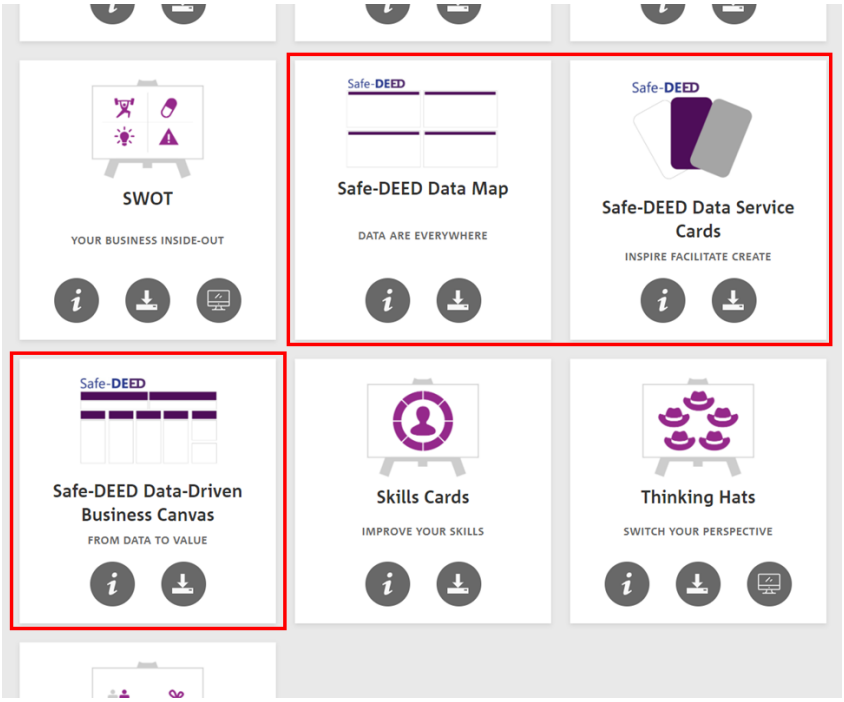

Figure 18: Tool overview including Safe-DEED tools

The download variant "Download tool" consists of a clickable pdf version of the Data Map and the DDB Canvas and a pdf file of the Data Service Cards. The download variant "Download tool and explanation" consists of compact information (pdf file) on the tools in form of 4-6 pages including how to use instructions, the tool template and a described example.

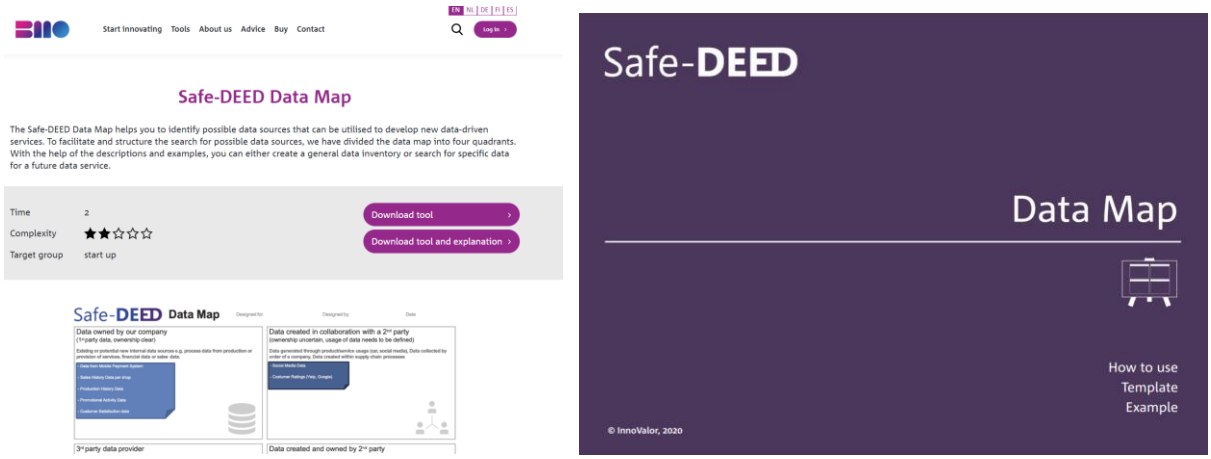

Figure 19: Available information of each tool

As the BMO platform attracts an increasing number of users (approx. 25k in 2020) from all over the world (focus on EU countries and USA) the provision of the Safe-DEED business model tools on the platform is a valuable occasion for promotion of the Safe-DEED project results.

6 Conclusion

Within the present deliverable, we provide the result of the development process of supporting tools to enable business managers to develop data-driven Business Models by applying Safe-DEED technologies. The report outlines the development, the application and the evaluation of three tools and their integration (online availability) at the Business Makeover platform.

As a starting point in the business model innovation process, we present in Section 2 the Safe-DEED Data Map. The Data Map is a visual supporting tool to identify possible data sources with a specific focus on data which are potentially utilisable with Safe-DEED technologies. Next, we describe the Safe-DEED Data Service Cards (Section 3) which can be used as inspiration and creativity support in the ideation phase of a data-driven innovation. Building on this the Safe-DEED Data Driven Business Canvas (Section 4) can be used to develop ideas into use cases including financial considerations. Finally, we demonstrate the availability (online and free of charge) of the three tools on the business model innovation platform "Business Makeover". Since the platform has already a high user bases from all over the world (focus on EU countries and USA) the provision of the Safe-DEED business model tools on the platform is a valuable occasion for promotion of Safe-DEED project results.

In the remaining project duration we would like to concentrate on the evaluation of the tools and work out possible improvements regarding usability and interaction of the tools. For this purpose we will use the Safe-DEED use cases (use case partners) but also try to involve external companies in this process.

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