D2.3 Möbius evaluation framework and large scale pilot descriptions

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Executive Summary

Deliverable 2.3 reports on task 2.2. The aim of the task is “designing and developing the criteria, the process and the tools that will be used to evaluate and measure the project activities, hypothesis, results and impact. This task will further elaborate and detail scope, plans and schedules for the pilots”. The evaluation framework to assess project’s impacts has been elaborated and improved since the beginning of project activities. The evaluation framework has been drafted by DEN and co-designed and validated by project partners to guarantee its applicability. In particular, the evaluation framework has been informed by ex-ante scenario research conducted within WP2 activities and reported in D2.1 under the chapter 4 “Current practices and trends within the publishing industry”. Moreover, the evaluation framework has been further modified according to the specific needs which emerged from the conducted pilot.

D2.3 describes the theoretical framework on which the impact assessment relies on, the methods and tools that will be used to assess projects activities and the stakeholders involved in the process. Furthermore, the plan and activities for the large-scale pilots are reported as well to provide detailed information on ongoing activities and next steps.

The deliverable is divided into three chapters.

Chapter 1 reports the theoretical references on the impact assessment approach and discusses the need to assess the project outputs to provide information for the book industry.

Chapter 2 is dedicated to the definition of the output to assess, stakeholders to involve and to the description of impact areas and dimensions that will be analysed.

Chapter 3 describes the plan to test project outputs for large scale pilots and the applied methodology.

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Terminology and Acronyms

DOA	*Description of the Action*
EC	*European Commission*
EU	*European Union*
F2F	*Face-to-Face*
FP	*Framework Programme*
MB	Möbius Book
MCT	Möbius Creator Tool
PIT	*Prosumer intelligence Toolkit*
PMB	*Project Management Board*
PMP	*Project Management Plan*
SFX	*Sound effects*
STAB	*Scientific and Technical Advisory Board*
UI	*User Interface*
UR	*User requirements*
WP	*Work Package*

1 Introduction

As reported in the literature, book industries have been dramatically affected by technology (Magadán-Diaz and Rivas-Garcia, 2021). Changes are visible on several dimensions, impacting books' production, distribution but also exploitation. In relation to book production, the digitization of printing processes has driven the development of digital printing (Wurth et al., 2018). Such innovation provides a more efficient and flexible tool for printing houses to meet the new demands and requirements of the market. Among the others it allows shorter print runs, printing on demand and customization of print copies (Gallagher, 2014). Regarding the distribution, e-book and digital devices have reshaped the traditional value chain modifying the physical distribution logic. In terms of exploitation and reading experience, on one hand, audio books are leading the readers toward a more immersive experience, on the other hand, the opportunities opened by social platforms are fostering the capability to co-create and share the writing and reading moment with other readers.

Möbius' project embraces the digital revolution which is affecting the book industry by providing new perspectives. On one hand, the project develops technological outputs that can potentially further change the market and the users' exploitation (e.g Möbius book and Prosumer Intelligence Toolkit). Besides, the project provides scientific knowledge to inform the industry and its players (e.g creating new business models for the sector). In line with this, it is important to validate new developments through pilot phases but also to assess the expected impacts of such new solutions. By performing a thorough assessment, it will be possible to map and analyse the potential impacts of the project in the long run. The potential impacts of the project have been designed in relation to the project's outputs and after a careful evaluation on how the project's results could have an impact on the current publishing sector. The potential impacts have been derived from common reflections with the project partners, then, these have been matched with already defined dimensions of impact. The process is defined in the next section.

1.1 Evaluation framework for the Möbius project

The methodology for impact assessment has been defined as a flexible tool to be sufficiently responsive to potential adjustments in the next step of the development process. Indeed, as the project is subject to potential challenges created by technological and development needs, the methodology intends to be adaptable to emerging areas and values to assess. For the sake of clarity, instead to define strict KPIs, we have opted for reporting in the deliverable an extensive list of dimensions and indicators to assess. This kind of approach has been needed because, at the moment of the writing, technological development didn't allow to define KPIs. However, the work done will allow to easily move into the definition of KPIS for assessment as soon as the technological development and pilot phases will progress,

As anticipated, the proposed framework follows an iterative approach. First of all, the impact assessment framework has been co-designed with partners engaged in WP2: DEN, IMEC, and ENOLL. Accordingly, several meetings have been organised to set up the framework and define the dimensions to assess (i.e. indicators for project outputs). Those meeting have been informed by previous research made within the project. For instance, the ex-ante scenario

requested in the DoA and reported extensively in D2.1 has been crucial to inform the impact assessment dimensions to consider and the potential indicators to map. After the internal round of meetings, a workshop to validate the methodology was held with all project partners to get specific insights given their in-depth knowledge of the sector and specific competences on the project's aims. The meeting was held in Barcelona during the plenary meeting organised in December 2021. During the workshop, thanks to the use of facilitation methodologies, all partners were asked to provide feedback on the suggested indicators for all the outputs of the project. This step was crucial to adjust the methodology setting. After that, all comments and suggestions have been elaborated and considered by WP2 partners who have further integrated the input to finalise the methodology reported hereafter.

Nevertheless, the methodology is conceived as a work in progress: this framework is going to be monitored and fine-tuned during the project lifetime by taking into account the lessons learned during its application during the pilot phases.

1.2 The overall approach and definitions

The International Association for Impact Assessment defines impact assessment as "the process of identifying the future consequences of a current or proposed action" (IAIA, 2009). In other words, the "impact is the difference between what would happen with the action and what would happen without it". Aim of the analysis is to find answers to the following questions:

- What is the difference that Möbius can make on the current state of the publishing sector?
- Why is Möbius relevant and who are the stakeholders potentially impacted by the project innovation?

To map the impact of the project, the adopted framework is based on the impact value chain approach (Figure 1) which is the de facto standard for many international bodies, including the EC.

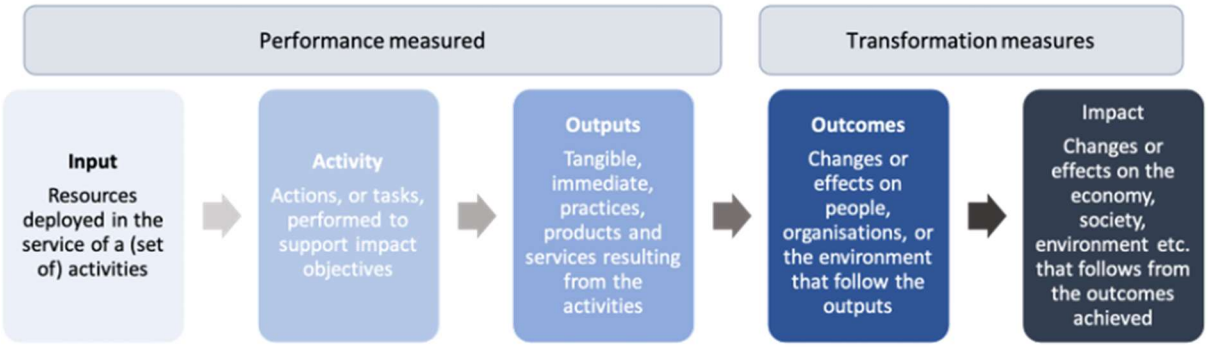

Figure 1. Impact assessment framework: the value-chain approach (elaboration on IMWG, 2014:6).

In other words, the aim of the impact assessment framework is to answer the questions: "what is the difference generated by the project?" and "For whom?"

To reply to these questions, a theoretical and methodological framework that looks at the entire chain of project development was drafted, starting from the work carried out by the DEN team in previous European projects including Media Futures[1] and Rebuild[2]. Among other European projects in which the proposed methodology has been applied, we can mention SEQUOIA (Passani et al., 2014), MAXICULTURE (Bellini et al., 2014), IA4SI[3] (Bellini et al., 2016), and more recently ACTION[4] (Passani at al., 2020).The fact that the methodology has already been tested in previous projects suggest that the applied framework has already been successfully validated. As said, the general framework was then applied and tailored to the needs and specifications of the Möbius project and domain. For this reason, the selection of dimensions and variables was guided by literature review, reported in the sections addressed to dimensions, and several rounds of experimentation and refinement. The process (Chapter 2) and preliminary results (Chapter 3). are described in the next sections.

[1] https://mediafutures.eu/
[2] https://www.rebuildeurope.eu/en/default.aspx
[3] http://ia4si.eu/
[4] https://actionproject.eu/

2. Möbius evaluation methodology

2.1 The Möbius outputs to assess and the stakeholders to engage

As reported in other deliverables (such as D2.1), the Möbius project will produce two main technological outputs, the Prosumer Intelligence Toolkit (PIT) and the Möbius Book (which is based on two main features: the Creator Toolkit and the Möbius Book Player), and one theoretical output (the prosumer business model).

The Prosumer Intelligence Toolkit collects data from existing online communities and online prosumer activities to provide publishers and professional users with additional insights on the book industry.

The Möbius Book is based on two features:

- The Möbius creator toolkit is a web-based app that allows creators to design immersive books, including user data from Möbius book players.
- The Möbius book player is an interactive mobile application used to consume the Möbius book.

The business model is about designing a new approach for the traditional book value chain to reshape the business model considering technological innovation and changing users' needs and habits.

The evaluation framework has been structured to assess all the outputs. However, for the sake of clarity, it is important to stress that the evaluation framework for the prosumer business model has been elaborated and is described in the next chapter, but we won't proceed with the evaluation of the new business model during the project. This is due to the fact that the evaluation of a business model would imply that a publisher will adopt it for its own value chain. Although this is a desirable result, it is an outcome which requires time and commitment from a publisher, and it is not realistic that this will be achieved during the project duration. Nevertheless, impact areas and dimensions have been described also for the business model to provide a tool for assessment in case it will be adopted by publishers in the upcoming years. To overcome this potential shortcoming, the new business model will be validated with publishers from a theroretical point of view to get feedback on the potential application for the book industry.

As the outputs are different and are designed for different kinds of users, validation will be based on several typologies of stakeholders. The following Figure 2 reports what kind of stakeholder is considered for output.

- prosumer intelligence toolkit: professional end-users (e.g publishers)
- Möbius book player: readers, prosumers
- Möbius book creator: writers, self-publishers, prosumers.
- prosumer business model: publishers

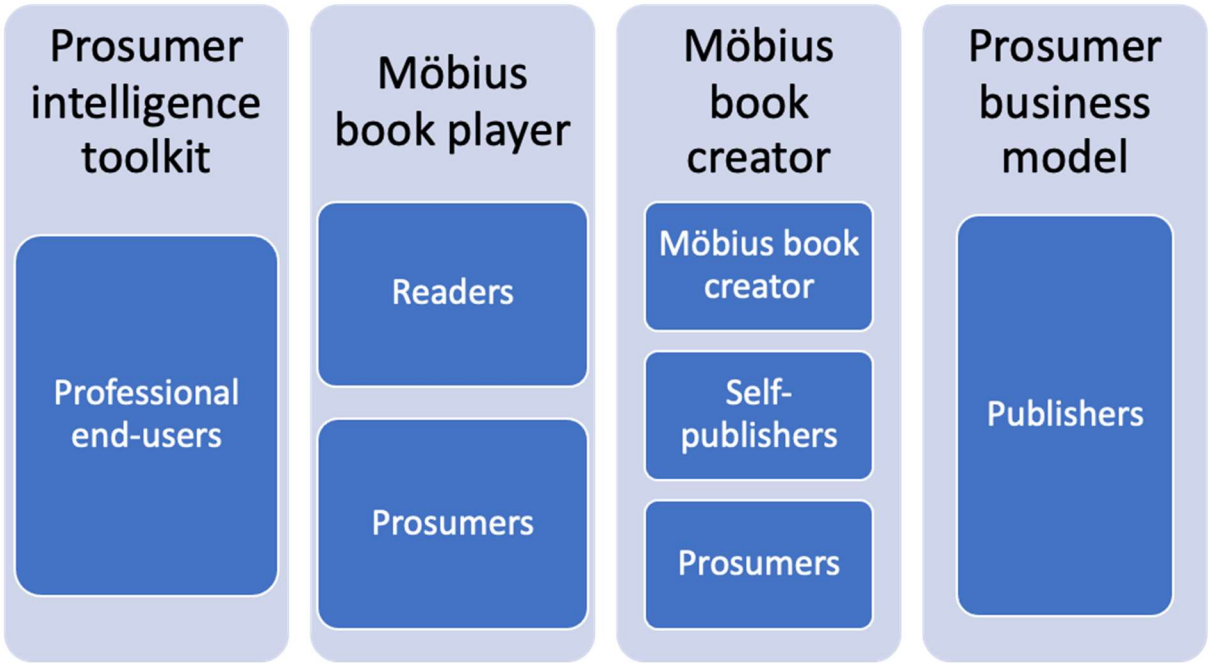

Figure 2. Möbius stakeholder groups

2.2 Möbius impact assessment framework: impact areas and dimensions

Starting from a specific methodological framework adopted to run impact assessment (Passani et al., 2014; Bellini et al., 2016), we have identified the most relevant impact areas for the project. Accordingly, the Möbius impact assessment framework will consider four areas of impact: Social, Economic, Environmental and Technological impact. Each impact area covers some dimensions expressing the complexity of the effects that the project outputs can potentially generate. The analysis will cover the entire time span of the Möbius project development (see section 2.4). For this reason, it will be possible to observe and measure changes in progress in the short and medium term, while it will not be possible to trace long term effects. Nevertheless, attention will be paid to those indicators of potential or expected impact for the future of the project.

In the following paragraphs, all the areas and dimensions are described in detail, showing their relevance to the specific output and the intrinsic quality of the Möbius project. Table 1 offers a general overview of the distribution of dimensions and output.

Areas	Dimensions	Outputs
1. Social impact	Impact on behavioural change	Möbius book player
	Impact on education	Möbius book creator
	Impact on knowledge production	Prosumer intelligence toolkit

	Impact on social Innovation	Prosumer business model
2. Economic impact	Impact on cost reduction	Möbius book creator
		Möbius book player
		Prosumer business model
	Impact on organisational practices	Prosumer intelligence toolkit
	Impact on production process	Möbius book creator
	Impact on revenue opportunities	Prosumer business model
3. Environmental impact	Impact on sustainable consumption of goods and services	Prosumer business model
4. Technological impact	Impact on the use of technology	Möbius book player
		Prosumer intelligence toolkit
		Möbius book creator
	Impact on data usage	Prosumer intelligence toolkit
	Impact on ICT-driven innovation	Möbius book creator
		Möbius book player
		Prosumer intelligence toolkit

Table 1. MÖBIUS impact areas and related dimensions and outputs

2.2.1 Social impact and dimensions

Social impact is the area that, compared to the others, more significantly expresses the ultimate direction of the project, i.e. to produce change towards the general public. This area considers the set of transformations that the project entails to the social groups that in different ways participate in the process, and potentially to the rest of society (Vanclay 2003). Four dimensions will be observed: behavioural change; education as acquisition of specific and transversal skills; knowledge production; and social innovation, as forms of engagement of readers and writers who can potentially open new spaces for cultural and social change.

Impact on behavioural change

Behavioural change is perhaps the most easily observed effect of the introduction of a new technology into society. The change may concern the routines of daily life, the habitual uses of devices, the forms of social relations that are mediated by technology. This set of changes can only be partially foreseen by the innovator, and therefore requires constant attention to the

needs and characteristics of the target audience (Bellini et al. 2016). Below in Table 2 some of the indicators that will be considered in the analysis of this dimension are illustrated:

Indicators	Output
Accessibility to elder adults, people with disabilities	Möbius book player
Change in reading habits	Möbius book player
Engagement increase in book consumption	Möbius book player
Increased media competences of new social groups - i.e. elderly adults	Möbius book player

Table 2. Impact on behavioural change

Impact on education

Innovation in digital publishing has a direct influence in terms of learning by the subjects involved (Martinez-Estrada and Conaway 2012). The dimension of education includes *digital skills* of authors as well as content creators (as levels of know-how, ability, and awareness in the use of ICT devices, such as knowing how to install a software or creating, editing a video shared via social media), but also *writing skills* of authors. Improvements in these two skills can have an impact on users' engagement (Bergdahl et al. 2020). Educational impact will be explored through the following illustrative indicators in Table 3.

Indicators	Output
Increase digital skills for authors	Möbius book creator
Increase writing skills for authors	Möbius book creator
Increased digital skills for content creators	Möbius book creator
Increased engagement with prosumers	Möbius book creator

Table 3. Impact on education

Impact on knowledge production

Knowledge is at the core of the Möbius project in almost all the dimensions that are detailed here. Indeed, innovation in the digital era involves a circulation of knowledge in order to survive and obtain recognition of the general public. In this project, data on reader-user behaviour, information about the context of the publishing market, and comparisons with other practices inherent to cultural production will be examined using the following illustrative indicators reported in Table 4Table 5.

Indicators	Output
Compatibility with current practices	Prosumer intelligence toolkit
Increased ease of knowledge gathering	Prosumer intelligence toolkit
Potential increase in insight in self-publishing (content, trends, likes, etc.)	Prosumer intelligence toolkit
Potential increase in knowledge on new engagement opportunities	Prosumer intelligence toolkit
Potential increase in knowledge on user behaviour and	Prosumer intelligence toolkit

market trends	
Potential increase in understanding of readers	Prosumer intelligence toolkit
Relevance of data / Knowledge / PoC	Prosumer intelligence toolkit
Sustainability of knowledge production	Prosumer intelligence toolkit

Table 4. Impact on knowledge production

Impact on social Innovation

Social innovation can be defined as “new solutions (...) that, simultaneously, satisfy a social need (more effectively than existing solutions), create new or better capabilities and relationships, and make better use of assets and resources” (The Young Foundation cited in Portales 2019). As it connects the system of production with that of consumption, the project has a clear relevance in terms of social inclusion, which in turn is a potential driver for social innovation. Prosumer engagement has been recently studied in a case of transmedia branding highlighting the role of prosumers as “partners in a mutually beneficial innovative process” (du Plessis 2019). In the Möbius project, this kind of potential effect in the engagement of readers, authors, and communities of readers, will be measured through the following illustrative indicators (Table 5)

Indicators	**Output**
Allow experiments with prosumers creating fan fiction	Prosumer business model
Higher level of engagement (conversation) between reader and authors	Prosumer business model
Higher level of engagement (conversation) between reader communities	Prosumer business model

Table 5. Impact on social innovation

2.2.2 Economic impact and dimensions

The economic area comprises a set of indices describing the economic results that a project produces over its lifetime (Bellini et al. 2016). It is a broad area that includes indicators of reorganisation and redistribution of resources in organisational and production practices, as well as business opportunities and revenues made possible by the implementation of the project. In the perspective of innovativeness that guides design in the cultural and creative sphere, an important aspect is the economic sustainability that is understood as access to stable sources of income over time. Sustainability can also be interpreted as adaptation to emerging and competitor markets. An example is the emerging use of podcast and audiobook circuits in digital publishing (Have and Pedersen 2020). In the analysis of this area, the following four dimensions will be examined: namely, (1) impact on cost reduction, (2) impact on organisational practices, (3) impact on production process, (4) impact on revenue opportunities.

Impact on cost reduction

One of the meanings of innovation relates to the optimisation of resources which, within the economic impact analysis, has an explicit reference to cost reduction. In the context of publishing, cost reduction is related to the dematerialisation caused by electronic devices (Coroama et al. 2015). Due to the technological affordances and features of the devices, scalability (which can be evaluated in terms of savings) is potentially easier. Potential cost savings can be identified in the alignment of book demand-supply alignment, in the adoption of more effective marketing strategies, and in book production and printing process (e.g. digital versions, print-on-demand). The dimension of impact on cost reduction will be explored through the following illustrative indicators (Table 6).

Indicators	Output
Cost saving for cross media productions	Möbius book creator
Scalability	Möbius book creator
Time saving for cross media productions	Möbius book creator
Cost reduction for the producer	Möbius book player
Costs reduction per book experience for the consumer	Möbius book player
Entry point to other media sectors	Möbius book player
Platform to test new products or services	Möbius book player
Better demand-supply alignment, less overprinting and less returns of unsold books	Prosumer business model
Cost & time savings in book production	Prosumer business model
More effective marketing if all titles can be printed in smaller runs, or made available digitally	Prosumer business model
More virtual collaboration in book production process (between authors, editors, art dept.)	Prosumer business model

Table 6. Impact on cost reduction

Impact on organisational practices

Innovation often has an impact within the organisation's practices that may facilitate or hinder the relationship with collaborators, consumers, and other stakeholders (Passani et al., 2014). New information and data as input can make changes in the decision-making process as well as those in the organisational responsiveness to user demands and expectations. For instance, they can determine changes in the production value chain. These are just a few examples of the organisational practices that can be transformed by an innovation in the sector considered by the project. In the analysis will be considered the following illustrative indicators (Table 7).

Indicators	Output
Potential change in production value chain due to new information and data	Prosumer intelligence toolkit
Potential improvements in content recommendations	Prosumer intelligence toolkit
Potential increase in responsiveness to demands of users	Prosumer intelligence toolkit

Potential Influence on decision making processes (production, marketing, sales)	Prosumer intelligence toolkit

Table 7. Impact on organisational practices

Impact on production process

Innovation in the sector of digital publishing also has an impact on the production process. The role of the prosumer characterised the digital economy in recent decades, especially with the transition to Web 2.0. In the assessment of this dimension, the changes triggered by the use of innovative tools by stakeholders and the flow of data and knowledge generated by prosumers will be monitored through the following illustrative indicators (Table 8).

Indicators	Output
Change in production practices due to stakeholder use of the tool	Möbius book creator
Ease promotion of contents	Möbius book creator
Increase collaboration on cross media productions	Möbius book creator
Increase insights based on user data (device, popularity, sharing)	Möbius book creator

Table 8. Impact on production processes

Impact on revenue opportunities

The economic significance of a publishing project also lies in the revenue opportunities it can generate. A plurality of aspects can be exploited to generate revenues starting from a more detailed knowledge of the consumer user, his tastes, and behaviours, and from a better knowledge of the book marketing perspectives. The analysis of this dimension will be carried out based on the following illustrative indicators (Table 9).

Indicators	Output
Bonus chapters sold at premium value	Prosumer business model
Experiments with new revenue models (premium books, subscription model on serial publishing, revenue sharing between fans & publisher)	Prosumer business model
More detailed consumer profile information	Prosumer business model
More knowledge on which books to market when	Prosumer business model
Personalized books sold at premium value	Prosumer business model

Table 9. Impact on revenues opportunities

2.2.3 Environmental impact and dimensions

Within the cross-media publishing industry, digitisation has a rather considerable environmental impact by eliminating production and logistical processes that are rather burdensome in terms of sustainability. However, it should not be overlooked that digitalisation also entails considerable ecological costs (from the source of the energy supply to the minerals and plastics needed to produce the devices) (Hilty and Aebisher 2015). Following Bellini et al. (2016), environmental impact “tackles the changes introduced in citizens’ way of thinking and

behaviours, especially as related to more sustainable individual and collective behaviours and lifestyle". In the assessment of this dimension area, the changes brought about by the developed Prosumer business model will be observed with respect to consumption behaviour, viewing style, and awareness about sustainability as described in the following dimension.

Impact on sustainable consumption of goods and services

As in the adoption of remote meetings, cost reduction can go hand in hand with achieving a higher level of sustainability. Due to the characteristics of the Möbius project, it is possible to decline the theme of sustainable consumption with respect to the physical production of books with respect to sales. Therefore, the indicator listed below will be examined in this context (Table 10).

Indicators	Output
Size of various print runs (hardcover, paperback) better attuned to possible sales numbers	Prosumer business model

Table 10. Impact on sustainable consumption of goods and services

2.2.4 Technological impact and dimensions

In the implementation of the project, we will monitor impacts related to technological assets, from the use of tangible (devices) and intangible (data) resources to the tools and services provided to consumers. These changes may be promoted by technological innovation or by a change in cultural perspective or the encounter with user experiences. In this sense, the technological assessment will describe the impact of the project in terms of technological productions, but also the impact on users' behaviours and awareness of technological resources (Bellini et al. 2016). This area of impact will be analysed in following three dimensions.

Impact on data usage

Among the effects of digitalisation in daily life, the use of data is one issue that is at the core of attention of both operators and regulators. It concerns both protection of private and corporate data (GDPR, IPR), but also innovations that are generated and facilitated by new technologies of machine learning and artificial intelligence (Andrew and Baker 2021). The impact will be measured in quantitative (e.g. new datasets developed, number of data sources used) and qualitative terms (e.g. quality of data outputs, awareness and adoption of smart uses of data). The combination of these measures will make it possible to represent how the project is moving in a highly complex landscape that entails uncertainties and criticalities. The illustrative indicators that will be measured are listed below (Table 11).

Indicators	Output
Increase in the diversity of the data sources used by publishers	Prosumer intelligence toolkit
Number of new datasets developed	Prosumer intelligence toolkit
Quality of data output	Prosumer intelligence toolkit

Smart use of data	Prosumer intelligence toolkit
Use of open data	Prosumer intelligence toolkit

Table 11. Impact on data usage

Impact on ICT-driven innovation

ICT-driven innovation includes those changes related to the development of technological tools and devices in the area of information and communication, but also related to the users who adopt them. In the assessment of this dimension the following illustrative indicators will be considered (Table 12).

Indicators	**Output**
Number of users of the Möbius creator tool	Möbius book creator
Compatibility with all devices and operating systems	Möbius book player
Number of users of the Möbius App	Möbius book player
Number of tools/features developed	Prosumer intelligence toolkit
Number of users of the toolkit	Prosumer intelligence toolkit

Table 12. Impact on ICT-driven innovation

Impact on the use of technology

The development and diffusion of a new technology, however useful or essential it may be from the point of view of the innovator, needs to be integrated with the expectations and needs of the end users to achieve real social acceptance. For the assessment of this dimension, the rate of satisfaction and usability by users (as quantitative metrics as well as evaluating the concrete user experiences in a qualitative way) will be considered alongside the following illustrative indicators (Table 13).

Indicators	**Output**
Co-created tool meeting the user requirements	Möbius book creator
Increase the fruition of multimedia book experience	Möbius book creator
Lowering technological barrier making an easy tool for all ages	Möbius book creator
Rate of satisfaction in using the toolkit	Möbius book creator
Usability: easy to use, easy to learn, easy to remember	Möbius book creator
Increased understanding of the story through immersive audio	Möbius book player
Rate of satisfaction of people experiencing the Möbius book	Möbius book player
Fluent shifting between audio layers	Möbius book player
Usability: easy to use, easy to learn	Möbius book player
Assessing user friendliness	Prosumer intelligence toolkit
Rate of satisfaction in using the toolkit (general + per feature)	Prosumer intelligence toolkit
User data: frequency of use, features / metrics used	Prosumer intelligence toolkit

Indicators	Output
Co-created tool meeting the user requirements	Möbius book creator
Increase the fruition of multimedia book experience	Möbius book creator
Lowering technological barrier making an easy tool for all ages	Möbius book creator
Rate of satisfaction in using the toolkit	Möbius book creator
Usability: easy to use, easy to learn, easy to remember	Möbius book creator
Increased understanding of the story through immersive audio	Möbius book player
during test period	
Co-created toolkit meeting the user requirements	Prosumer intelligence toolkit

Table 13. Impact on the use of technology

2.3 Data gathering and analysis

As reported in the previous paragraphs, the methodology has defined 4 impact areas related to 12 impacts' dimensions relying on 67 indicators. Data about indicators will be collected adopting a custom-made approach. This will be structured respecting the specificity of each output in order to collect specific data without losing meaningful information. We will follow a mix-method approach, in which qualitative and quantitative data will be processed to define and measure impacts in the areas and dimensions described above. This will result in articulated and complex descriptions that holds together the numerical measurement and meaning of the observed transformations. In this way, it will be possible to extrapolate new aspects worthy of analysis through an interpretative-reflexive approach (Geertz, 2008). Alongside the previously identified standardised indicators. The methodological framework adopted is modular and flexible, capable of resetting by inputs gathered in the process, and oriented towards a cumulative analysis until the end of the project.

All data of the impact analysis will be obtained through desk research and surveys.

- Desk research includes the examination of internal reports, drafts, presentations, and other types of internal/external documents which make it possible to trace effects especially in the areas of **economic, technological, and environmental** impact. From this first source of data, it will be possible to collect quantitative data but also to identify main recurrences worthy of being structured and examined through surveys.
- Surveys will be mainly used for the exploration of the areas of **social, economic, environmental** impact. In addition, the questionnaires will be structured to collect both standardised measures, by closed questions, but also views, perceptions and experiences related to the identified dimensions.

Given the richness and diversity of the data, the impact analysis will follow the matrix of areas and dimensions presented in the previous paragraphs making both the time of data collection and the time of analysis flexible but related to the pilot phase (as reported in paragraph 2.4).

The analysis will mainly consist of a statistical reading of the quantitative data, processed in aggregate form through supporting software tools (SPSS[5]). The organisation of the qualitative data collected through desk research will be facilitated using the qualitative analysis software NVIVO[6]. A thematic analysis (Braun and Clarke, 2006) will be performed through keywords and classification of relevant citations, identification of trends and recurring concepts in order to identify latent themes. Codification and organisation of the themes will be integrated by results of the statistical analysis. Due to the very iterative nature of the mix-methods approach, the final report will consist of this double outlook toward the impact of the Möbius project in all areas considered.

2.4 Timeline and next steps

The plan for the impact assessment follows the three pilot phases described in the DOA and extensively reported in the next chapter. In particular, the evaluation will be a parallel activity, to assess the project's outputs immediately after the pilots. The plan is to engage the same stakeholders who will test the outputs to assess the dimension reported above, all other dimensions that are not depending on the stakeholders (e.g analytics), will be retrieved in the same period of the time, to avoid a fragmented approach.

The plan for assessment is the following:

- evaluation pilot phase 1 running from month 9 to month 12
- evaluation pilot phase 2 starting in month 13 to 18
- evaluation pilot phase 3a from month 9 - M30 and 3b from month 31 to 36

The following Figure 3 provides an overview of the timeline and how the pilot phases evolve.

[5] IBM SPSS website
[6] NVIVO website

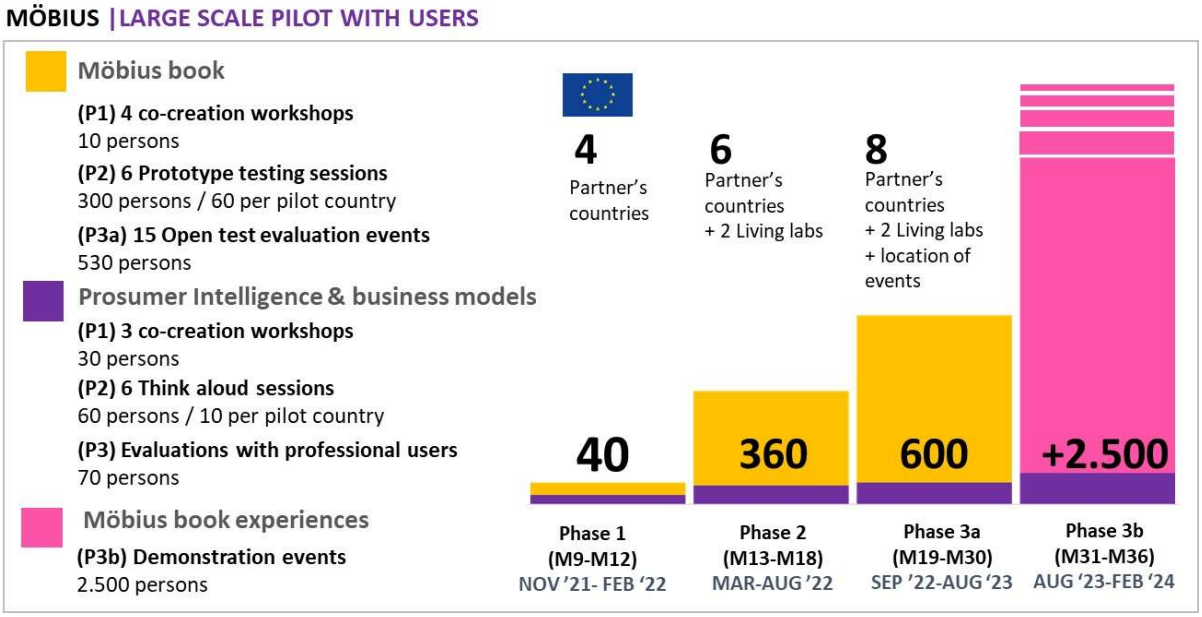

Figure 3. Möbius large scale pilot

In the next section, we describe the activities in each of the three pilot phases.

3. Large scale pilot descriptions

In the following sections, we will present the different research methods that will be applied during the three pilot phases, as well as the concrete setup and schedule of pilot phases 1 to 3. This methodological approach is part of imec's living lab approach. The main strengths of this approach are the involvement of all relevant stakeholders from the early stages of the design process (i.e., starting in the requirements phase); the iterative test- and feedback loops and the opportunity to set-up large-scale tests in real-life environments.

○ 3.1 Methods and validation phases

The iterative approach allows the potential end-users to test and provide feedback in different stages, from early mock-ups and prototypes to the more mature proof of concepts. This is the case for all developed applications within Möbius: Prosumer Intelligence Toolkit, Player and Creator. In this way, the developed technology and applications are co-created together with all relevant stakeholders (end-users, technology partners etc.). A more concrete description of this methodological framework can be found in D2.1. Here, we will focus on the practical implementation of this methodological framework in the three pilot phases. The pilot phases will evolve from small-scale tests with limited user numbers, to more large-scale testing with large user numbers, as is shown in Figure 3 above. A combination of qualitative and quantitative methods is applied in this approach, including co-creation workshops, think aloud sessions, interviews, focus groups, observations, and surveys. For each pilot phase, we discuss the goals, timing, products developed, and methods used, including the participant target group and the collaborative effort of project partners in terms of organisation, practical execution, recruitment and analysis and data handling for each of the developed products.

■ *3.1. 1 Pilot Phase 1*

Goal of this pilot phase: co-create first prototypes for Möbius PIT, Möbius Creator and Möbius Player, gathering insights in the basic user requirements for each of the products and current practices of each of the stakeholders involved (i.e., readers / prosumers, writers, and publishers)

Timing: The first pilot phase took place from M9 - M12.

Methods and set-up:

The main method used for this first phase were the co-creation sessions, to develop the first concepts and prototypes for the different tools. Because of Covid-19 regulations, it was unfortunately not possible to organise these sessions with in-person attendance as planned. Therefore, these sessions were organised in an online environment, with specific focus on safeguarding the co-creation creative aspects. The first pilot phase was organised in the four consortium countries (Belgium, Spain, Germany, and Italy). The selected platform for the co-creation sessions was MS Teams, but additional tools like Thorium[7] and MIRO[8] were used to

[7] Thorium website
[8] Miro website

allow users to test the mock-ups and prototypes and to facilitate the process. Due to the online setup, we could easily record and automatically transcribe each session. After recording and auto transcription, participants' names were pseudonymised, following the GDPR requirements. imec-SMIT oversaw the preparation of the co-creation sessions protocol and guideline documents, which were distributed to the other partners hosting the sessions. imec-SMIT organised the different sessions in collaboration with ENoLL, Bookabook, Eurecat and MVB. For the analysis, all the transcripts, recordings, drop-off surveys, and informed consents were sent to imec-SMIT, afterwards the other partners deleted their copies. The following visual (Figure 4) highlights the setup of the tests, the target group and the expected outcomes:

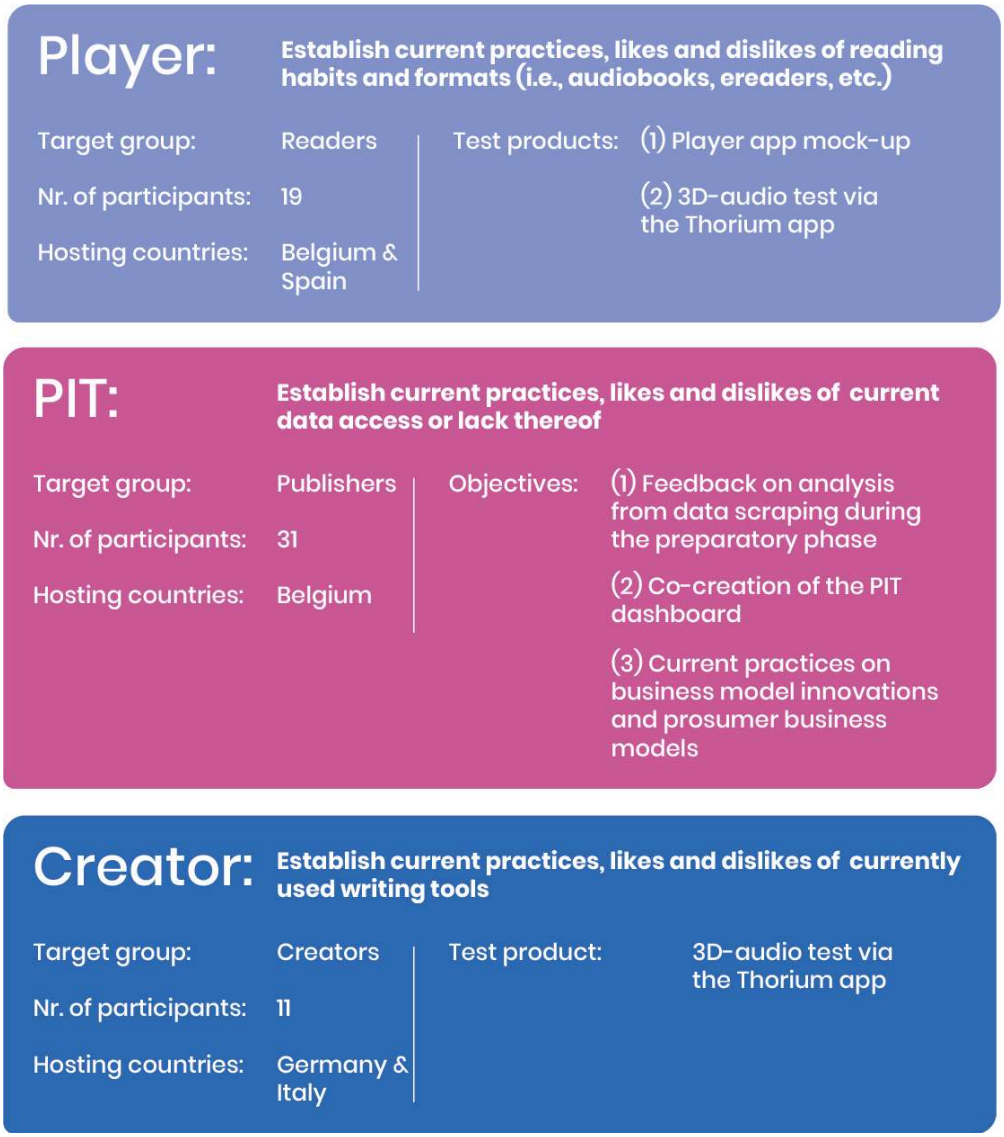

Figure 4. Overview about tools and activities

The outcomes of the first pilot phase will be reported in D2.4 in M36, but an intermediate report was drafted and made available to all consortium partners via SharePoint. A brief summary of the results is added in this deliverable in section 3.2.

3.1.2 Pilot phase 2

Goal: Test the first prototypes and mock-ups: PIT data-dashboard mock-up, Player mobile application prototype, and Creator web-application prototype. Gather input for an update in user requirements, identify thresholds and strong points for adoption.

Timing: The second pilot phase takes place from M13-M18

Methods and set-up: The following methods should allow us to increase the number of participants providing feedback and input for the developed prototypes and mock-ups:

The **Möbius PIT** mock-up will be presented to 60 professional end-users (i.e., publishers and booksellers) through (online) individual think-aloud sessions, where we ask participants to use the dashboard mock-up while they explain their actions and intentions, express their opinions, likes and dislikes. Although the testing is organised by imec-SMIT, FEP and Mobile World Capital are supporting recruitment efforts to ensure that publishers from all across Europe are reached. The outcomes will be: updated user requirements, thresholds, and strong points for adoption of the tool by publishers. More specifically, the think-aloud sessions should give us an indication of 3 aspects of use of the application:

- The *intention* of publishers when using the tool: providing answers to questions such as 'what are participants looking for?', 'which tasks do they perform with the tool?', 'how do participants conduct activities such as searches?' should lead to adjustment, redirection and optimisation of the initial set of user requirements.
- The *ease of use* for the participants involved: providing answers to questions such as 'how easy is it for participants to find the desired information in the app?', 'how easily can they 'read' the visualised data?'. This will give us the needed guidance to further develop a user friendly and intuitive web-application.
- The *accuracy and relevance* of the data: providing answers to questions such as 'How do participants evaluate the data currently available in the app?' and 'Do participants express a lack of certain data presented in the application?'. Answering these questions will allow the consortium to adjust the data analysis where necessary.

For the **Möbius Creator,** prosumers, amateur writers, and professional writers will receive the URL link redirecting to the Creator web-based application with the goal of uploading a chapter and adding immersive elements to the text based content (i.e., audio, pictures, etc.). After using the web-based application, participants are asked to provide feedback via a survey. Testing and recruitment is executed by MVB and Bookabook, with the support of imec-SMIT who will provide the protocols and survey (in English). The desired outcome is to confirm, redirect and optimise the user requirements for the web-based application and gather additional insights in how the developed tool could fit in with the creatives current practices.

The **Möbius Player** mobile application prototype will be tested in face-to-face (F2F) interactions with readers. In Belgium, Spain, Poland and Finland researchers will conduct field-research, by interacting with readers that can test the Player prototype in public places such as libraries, trains, beaches, book-related events, etc., followed by a brief survey to gather the participants' feedback. Imec-SMIT and ENoLL are the organising partners. The desired outcome is to understand if the application is user-friendly, and engaging for most of the participants, and that the immersive book experience delivered via the 3D audio is considered an added value. Furthermore, the user feedback should allow us to confirm, redirect and optimise the user requirements gathered in the first pilot phase.

Table 14 below provides an overview of the activities per Möbius product, and the roles of different partners involved in organisation and execution of the pilot activities.

Application	PIT	Player	Creator
Nr. of participants	60 publishers	300 readers, writers, prosumers	
Method	Online think-aloud sessions	F2F testing sessions in public and events, followed by a survey	Online distribution of the web-based application, followed by a survey
Hosting countries	Belgium	Belgium, Spain, Finland, Poland	Germany, Italy
Organising partners	imec-SMIT	imec-SMIT, ENoLL	imec-SMIT
Executing partners	imec-SMIT	Imec-SMIT (Belgium), EUT (Spain), living labs in Poland and Finland	MVB (Germany), Bookabook (Italy)

Table 14. Plan for pilots

Because this pilot phase is still in development, the approach can be changed when needed to adapt to unforeseen circumstances. In addition to the activities described above, the consortium is looking for events where the Möbius applications can be presented to larger audiences and members of our target groups.

3.1.3 Pilot phase 3

Goal: Pilot phases 3A-B will drastically increase the number of participants that will test the Möbius applications in their natural environment (i.e., open pilot). The aim is to organise evaluation of the proof of concept in 15 events where we will be able to assess the willingness

to adopt and the impact on future practices for each of the products, as well as the impact on the economic, societal and behavioural level.

Timing: Pilot phase 3A will take place from M19-M30, and phase 3B from M31-M36.

Methods: First, phase 3A and B will be organised in a semi-open to open environment, meaning the aim is to test the applications in a 'natural environment'. An overview of the activities is presented in Table 15 below.

Application	PIT	Player	Creator
Nr. of participants	70	530 in total	
Method	Observations, survey, in-depth interviews	Observations, in-app survey, in-depth interviews	Observations, survey, in-depth interviews
Hosting countries[9]	Belgium, Spain, Germany, Italy, Finland, Poland	Belgium, Spain, Germany, Italy, Finland, Poland, 2 event locations	Belgium, Spain, Germany, Italy, Finland, Poland, 2 event locations
Organising partners	imec-SMIT	imec-SMIT, Eurecat, ENoLL	imec-SMIT, Eurecat, ENoLL
Executing partners	imec-SMIT	imec-SMIT, Eurecat	MVB, Boobabook

Table 15. Planned activities for pilot phase 3

For the **Möbius PIT** this refers to the testing of the application in the publishers' office environment. The methods used will depend on the feedback we receive from pilot phase two and the further development of the application. In this phase publishers will be asked to consult the app as part of their daily routine. Evaluation of their experience through in-app surveys, monitoring of user data and additional in-depth interviews should allow us to identify opportunities for improvement as well as evaluate the willingness to adopt and the impact on the practices (societal, economic, behavioural) of the publishers involved.

For the **Möbius book**, this pilot phase revolves around allowing readers and writers to engage in the immersive experience of the Möbius book on specific events and in locations where readers might engage and interact with books. The consortium will organise 15 open test evaluation events for the Möbius Book (Player and Creator). Methods include observations, monitoring user data and in-app surveys, and in-depth interviews. Observations, user data and in-app surveys will provide input on the interest of readers and writers, and their willingness to adopt the app. In-depth interviews are used to qualitatively reinvolve participants that have

[9] The countries can change depending on the events where the Möbius applications can/will be tested during the summer (2022).

engaged in the co-creation sessions and evaluation activities in phase 1 and 2. These interviews will help us identify the thresholds for adoption and final aspects for improvement of the applications.

For the **Möbius book experience**, the quorum is to reach +2.500 participants during public events (i.e., book fairs), where visitors can test the Möbius experience organised by KKW. This involves immersive technologies and will allow visitors to experiment with the content generated in the Möbius book as a lived experience.

As this pilot phase is still in development, the approach can be changed when needed to adapt to unforeseen circumstances.

3.1.4 Analysis and data handling

After the data collection, the analysis of the various research activities will be handled by imec-SMIT. All input from the participants that will be collected during each of the pilot phases (i.e., recordings, transcripts, drop-offs, informed consents, surveys, images, and user data.) will be handled in accordance with the ethical guidelines (see deliverables D1.3 and D1.4) and the GDPR. imec-SMIT will store information on the VUB local SharePoint, and pseudonymise the participants names in the transcripts. Partners involved in the practical execution of the pilot activities will deliver all material to imec-SMIT and delete their local files.

Also, for future publications, no real names or contact information of the participants will be published.

3.2 Results pilot phase one

In this section, we present a brief overview of the results of the first pilot phase (M9-M13). In M36, the reports of pilot phases 1-3 will be published, and therefore, the draft report will not be shared yet with external parties. Still. The, the consortium partners do have access to the draft report and the full set of user requirements (UR). Below, we will share a summary of the results and the fewest remarkable outstanding UR for the Möbius Player (3.2.1), the Möbius Creator (3.2.2) and the Möbius PIT (3.2.3).

The first pilot delivered an abundance of feedback aimed at the three Möbius applications. To structure the feedback into usable UR, imec-SMIT analysed the different sessions per product, mapping the different opinions and feedback during the sessions. Based on these analyses, imec-SMIT developed a specific set of UR for each of the developed products, that will help the technical partners to improve the prototypes.

3.2.1 Möbius Player

For the Möbius Player, we organised three co-creation sessions with 19 participants, giving the participants a first glimpse of the immersive audio experience to evaluate. During the session, participants were asked to evaluate the Player application mock-up (presenting an early preview of the final application), and the 3D-audio clips (presented in the Thorium reader at this point but will later be integrated in the application). During the analysis we categorised three application domains for the UR: (1) mock-up, (2) 3D audio and (3) Reading experience. In the Table 16, we give an overview of the most striking UR for each of these themes.

Tool	Mock-up	3D-audio clips	Reading experience
User requirements	Dark mode	Users would like more control over the audio tracks (narrator, sound effects (SFX), and music)	Better text highlighting, the current yellow text highlighting can be improved (i.e., smoother)
	Give users access to statistics about their reading habits	User would like more variation in SFX and music	
	Implement a feature to take notes, scribbles, bookmarks, etc. that you can share with others	Narrator, sounds stale and lacks dynamic; also, the choice of different voices would be ideal	

Table 16. Overview of the application domain for UR

3.2.2 Möbius Creator

For the Möbius Creator, 11 participants took part in two co-creation sessions, where they discussed and developed their ideal immersive book creation tool (using the web-based Miro boards). In addition, they tested the 3D audio tracks via the Thorium reader. Three interesting application levels of UR include editorial tools, audiovisual elements, and general features to be added (Table 17).

Tool	Editorial tools	Audiovisual elements	General features
User requirements	Implement audio tools: EQ, clipper, recording feature, import audio function	Users would like a set of stock audiovisual elements	Document manager, managing different files (text, audio, etc.)
	Be able to customize your tools and work panel		Text-to-speech as a form of spelling and grammar check for the writer

Table 17. Möbius creator tool features

3.2.3 Prosumer Intelligence Toolkit

For the PIT, 31 participants took part in two co-creation session(s), two interviews, and a drop-off survey, where they discussed their current practises, needs and obstacles and developed their ideal data-dashboard tool (using the web-based Miro boards). In addition, we presented the data scraping activities and the results of the first analysis of those data, asking participants to evaluate the relevance of the insights provided. The Table 18 includes user requirements that refer to opportunities to integrate data, to increase consumer insights, and to allow publishers to make predictions about upcoming trends.

Tool	Consumer insights	Data collection tool	Prediction tool
User requirements	Demographic data (i.e., age, location, etc.)	Need for a data-dashboard that properly displays current data	Be able to predict upcoming/future trends, based on data
	Reading habits about the readers/users	Data-dashboard that can combine data from different sources/sets	
	Purchasing power (closely related to the demographic data)	Data-dashboard that presents data about the social interaction	

Table 18. PIT features in relation to user requirements

Conclusions

In conclusion, D2.3 set up the evaluation framework to assess the impact of the project. Such activity has been cod-designed with the help of consortium partners who provided valuable feedback on expected impacts and dimensions to be considered at theoretical level. Four impact areas have been reported together with a definition of 12 dimensions that will be assessed and related to 67 indicators. The deliverable also intends to clarify how the evaluation will be performed, with which tools will be used to collect data and how that data will be processed. As anticipated, the evaluation process is strongly connected to what happens during the project development. For this reason, if necessary, the methodology will be adapted to respond to the needs that might emerge in a later stage of the Project. Furthermore, the deliverable specifies how the project has structured the three pilot phases for outputs validation. A detailed description of the timing, methods and stakeholders involved is reported. Moreover, a dedicated paragraph presented the main results of the first pilot conducted. Also in this case, the pilots are conducted using an iterative process, lessons learned are always used to inform the next pilot reducing shortcoming and potential pitfalls.

The deliverable puts the basis for the work of validation and evaluation that started at the beginning of the project and will last until the very end. These are complex tasks which rely on several factors, such as, i) the collaboration of all partners in the preparation of the outputs but also ii) the participation and engagement from users and prosumers. Activities are planned to work following the technological development and to collaborate with all the stakeholders engaged in the activity. The aim is to guarantee high and pleasant participation from external stakeholders and fruitful exchange with the project's partners. In line with this, the first pilot has been important to test the approach and define main challenges to overcome. Indeed, the next steps will be more complex in terms of the number of people to engage and features to validate and assess but the approach has been designed to accommodate any potential issues. However, detailed information about the process, the challenges and the results will be reported in D2.4 to provide additional information also on how the process described has worked for this kind of project.

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