D2.4 Möbius value proposition: an evaluation

Project ref. no.	957185
Project title	Möbius: The power of prosumers in publishing
Project duration	1st March 2021 – 29th February 2024 (36 months)
Website	www.mobius-project.eu
Related WP/Task	WP2 / T2.4
Dissemination level	PUBLIC
Document due date	29/02/2024 (M36)
Actual delivery date	07/05/2024
Deliverable leader	DEN
Document status	Resubmitted after revisions

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 957185

Revision History

Version	Date	Author	Document history/approvals
0.1	May 2023	Simona De Rosa (DEN)	Table of Contents
0.2	May 2023	Simona De Rosa (DEN)	Draft 1: Chapters 2 and 3
0.3	June 2023	Stella Diakou (DEN)	Draft of Chapter 5
0.4	June-December 2023	All partners	Data collection during PP3
0.5	January 2024	Stella Diakou (DEN)	Draft 2
0.6	February-March 2024	Stella Diakou (DEN)	Executive summary; Chapters 1, 4, 5, 7, 8; Annexes
0.7	February-March 2024	Elias Blanckaert, Iris Jennes, Louise Hallström (IMEC)	Input in Chapters 1, 2, 3, 4, 6, 8
0.8	5 March 2024	Stella Diakou (DEN)	Draft 3 submitted for internal review
0.9	8 March 2024	Clara Pont (FMWC)	Reviewed by FMWC
0.10	12 March 2024	Spela Zalokar, Noemi Caiazzo (ENoLL)	Reviewed by ENoLL
0.11	14 March 2024	Stella Diakou (DEN)	Final revisions and layout
1.0	15 March 2024	Stella Diakou (DEN)	Submission
1.1	3 May 2024	Project reviewers	Comments for revision of deliverable
1.2	3 May 2024	Stella Diakou, Simona De Rosa (DEN)	Revision of Chapters 7, 8
1.3	6 May 2024	Iris Jennes (IMEC)	Revision of Chapter 8
2.0	7 May 2024	Stella Diakou (DEN)	Resubmission

Executive Summary

The Möbius project, funded under the European Commission Horizon 2020 aims to revitalise the European publishing industry by remodelling the traditional value chains and business models, uncovering the prosumers potential and delivering new enriched media experiences. A significant part of the Möbius project has been the development of technological tools that aim to enhance the media experience, while tapping into the potential of prosumers as co-creators and consumers of products and services that align with the Möbius objectives. Briefly, these tools are: the Prosumer Intelligence Toolkit [the toolkit collects data from existing online communities to provide publishers and professional users with insights on the book industry]; the Möbius Creator Toolkit [a web-based app that allows creators to design immersive books]; the Möbius Book Player [an interactive mobile application through which users can access and consume the books published in the Creator]; the Immersive Experiences (an immersive art installation centred on the contents of a book].

Deliverable 2.4 "Möbius value proposition: an evaluation" reports on Task 2.4: *"This task will run in parallel with the pilots to iteratively develop and test the value proposition of this project based on the evaluation framework (T2.2). It will provide a clear and compelling illustration of the benefits that Möbius tools, methods, and processes can bring to various stakeholders (publishing companies, online communities, living labs, etc.) both within the project and beyond (through future exploitation activities of the project's resources, as defined in WP6). It will define a high-level rationale which will guide and provide a common thread to its various activities – including how meaningfully cooperating with users (WP3, WP4, and WP5) can render social and business gains for the creative and cultural sector. Partner DEN will lead this effort, in close cooperation with partners leading user research aspects and prosumer business models (IMEC, CiTiP), as well as those carrying out open pilots and dissemination activities (ENoLL, KKW, FMWC)"*.

According to the methodology developed and presented in D2.3 "Möbius evaluation framework and large-scale pilot descriptions", D2.4 contains all the results from the assessment of the three Pilot Phases conducted by the project. D2.4 describes in detail what has been assessed, how, and when, and reports the main findings and results in terms of user evaluation and impact. It is important to stress that all the work has been conducted in a collaborative and iterative way, in the sense that each evaluation and assessment per Pilot Phase has been a way to provide suggestions to technical partners for further implementation. Certainly, the third and last pilot was the one where most of the user evaluation and impact assessment had been possible as outputs had reached a near-to-final version.

This deliverable is divided into 8 chapters. Chapter 1 summarises the methodological framework adopted for the evaluation and assessment of the Möbius project, submitted as D2.3 on M15. In addition, it gives an overview of the timeline for data collection and analysis. These aspects are further elaborated in the subsequent chapters, as each Pilot Phase followed a slightly different methodology for data collection.

Chapters 2, 3 and 4 describe Pilot Phases 1, 2 and 3 respectively, including separate sections for the general user evaluation and the impact assessment of the outputs (Möbius Creator, Player, Prosumer Intelligence Toolkit). Reporting for every Pilot Phase was completed sequentially. The reports in this deliverable also include the next steps that guided the testing in the subsequent Pilot Phases. Indeed, the evaluation and assessment for the Möbius project has been constructed as an iterative process which evaluates a precise moment of technological development but also informs the next stage of technical improvement. This means that the user evaluation and impact assessment should be considered as a self-reflective tool that can help the project to reflect on the outputs while the project life cycle is accomplished.

Chapter 5 discusses the assessment of the Möbius Immersive Experiences, i.e. the Immersive Experience, the Mobile Immersive Book Box, and the Virtual Reality Headsets. As reported in the methodological framework, DEN planned to assess specific dimensions related to the interaction of users with new technologies and their impact on the reading experience. Despite the fact that the impact assessment of the immersive experiences was not included in the DoA, DEN organised additional activities to map the main impacts of the immersive outputs produced as part of the Möbius project.

Chapter 6 gives an overview of the results of the general user evaluation of the Möbius outputs, while Chapter 7 summarises the results of the impact assessment of the outputs.

The concluding Chapter 8 presents an overview of the Möbius outputs in terms of the general user evaluation and the impact assessment. In addition, it highlights lessons learned and contains reflections and recommendations on how to improve evaluation and assessment of similarly oriented projects.

Table of Contents

List of Figures

List of Tables

Terminology and acronyms

ADHD		*Attention Deficit Hyperactivity Disorder*
AO3		*Archive of Our Own*
BB		*Bookabook Srl*
CiTiP		*Centre for IT & IP Law*
CTA		*Call To Action*
D		*Deliverable*
DEN		*Design Entrepreneurship Institute*
DoA		*Description of Action*
ENoLL		*European Network of Living Labs*
EUT		*Fundacio Eurecat*
FEP		*Federation of European Publishers*
FMWC		*Fundació Mobile World Capital Barcelona*
GfK		*Growth from Knowledge*
IAF		*Impact Assessment Framework*
IBC		*International Broadcasting Convention*
IMEC		*Interuniversitair Micro-electronica Centrum*
KKW		*Kunstkraftwerk Leipzig Gmbh*
KPIs		*Key Performance Indicators*
KPT		*Krakowski Park Technologiczny (Krakow Technology Park)*
Laurea		*Laurea University of Applied Sciences*
MIBB		*Mobile Immersive Book Box*
MVB		*Marketing Und Verlagsservice des Buchhandels Gmbh*
IN2		*IN2 Digital Innovations Gmbh*
OLLD		*OpenLivingLab Days*
PIT		*Prosumer Intelligence Toolkit*
PP1		*Pilot Phase 1*
PP2		*Pilot Phase 2*
PP3		*Pilot Phase 2*
SFX		*Sound effects*
T		*Task*
VR		*Virtual Reality*
WP		*Work Package*

1. Möbius value evaluation methodology at a glance

1.1 Methodology recap: challenges and opportunities

The Möbius evaluation framework was presented in D2.3 (submitted in M15) as a response to Task 2.2 on “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." The methodology for the impact assessment has been defined as a flexible tool to be sufficiently responsive to potential adjustments in the next steps 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. The proposed framework follows an iterative approach and has been co-designed with partners engaged in WP2: DEN, IMEC, and ENoLL. The utilisation of a Living Lab approach facilitated this procedure. This methodology guarantees that user input is considered at every stage of the development process. The requirements and needs expressed by users could be collected; by then passing on these user requirements to the technical partners, the apps could be optimised according to users' needs.

The Möbius project has produced the **Möbius Innovations** and the **Möbius Experimental productions**. The Möbius innovations include two main technological outputs, the **Prosumer Intelligence Toolkit** (PIT) and the **Möbius Book**, and one theoretical output - the **Prosumer Business Model**. The PIT collects data from existing online communities and prosumer activities to provide publishers and professional users with additional insights on the book industry. The Möbius Book entails two features: (i) the **Möbius Creator Toolkit** - a web-based app that allows creators to design immersive books and (ii) the **Möbius Book Player** - an interactive mobile application through which users can access and consume the books published in the app. The business model aims to offer a new approach for the traditional book value chain by considering technological innovation and changing users' needs and habits. The Möbius Experimental Productions include: (i) the **Mobile Immersive Book Box** (MIBB), a transportable 5m x 5m x 3m audio-visual space, allowing an immersive experience of the contents of a book; (ii) the **Virtual Reality** (VR) **Headsets**, which showcase the same experience as the MIBB, adapted to the VR headsets, allowing a user to experience the show without the need for a physical installation; (iii) the **Immersive Experience**, an immersive art installation hosted in Leipzig, Germany, at the KKW premises.

The evaluation and impact framework has been structured to assess all the outputs and it is reported in detail in D2.3. As the outputs are different and are designed for different kinds of users, validation was based on several groups of stakeholders, shown in Figure 1.

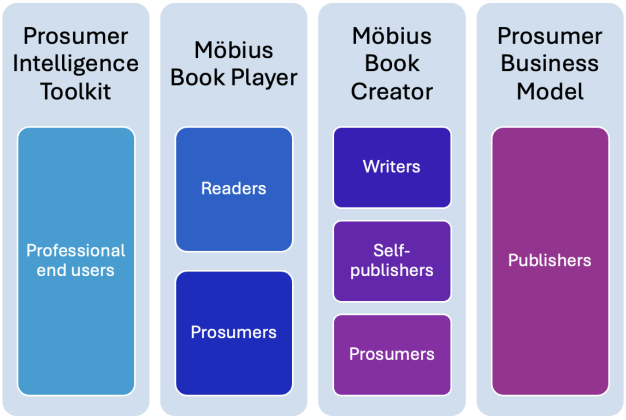

Figure 1. Möbius stakeholder groups

While Prosumer Business Models were evaluated (D3.5 "Final report on prosumer business models, cross-sector scalability and IP framework"), it was decided not to proceed with the impact assessment of these models. This is due to the fact that the impact assessment 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 difficult to be achieved during the project lifespan.

Starting from a methodological framework adopted specifically for impact assessments (Passani et al., 2014; Bellini et al., 2016), the most relevant impact areas for the project were identified. Accordingly, the Möbius Impact Assessment Framework considers four areas of impact: social, economic, environmental, and technological (Figure 2). Each impact area covers certain dimensions expressing the complexity of the effects that the project outputs can potentially generate. The analysis covers the entire time span of the Mobius project development. 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 impacts for the future of the project.

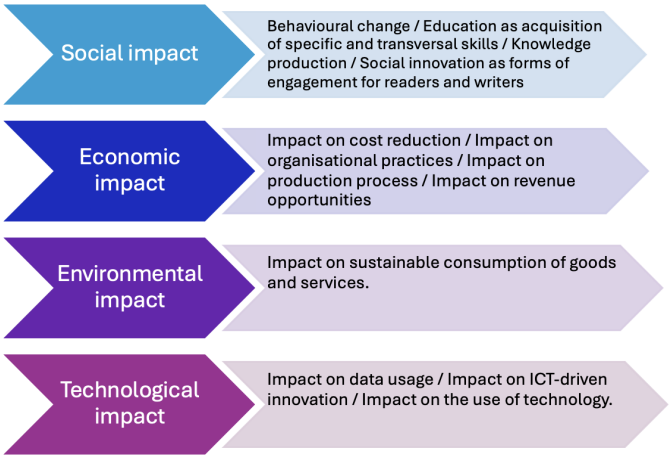

Figure 2. Impact Assessment Framework for the Möbius project

In the following paragraphs each impact area is discussed separately. **Social impact** is the area that 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 will have on 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.

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 dimensions will be examined: impact on cost reduction; impact on organisational practices; impact on production process; impact on revenue opportunities.

In the implementation of the project, impacts related to the **technological area**, from the use of tangible (devices) and intangible (data) resources to the tools and services provided to consumers, will also be monitored. 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 the following three dimensions: impact on data usage; impact on ICT-driven innovation; impact on the use of technology.

Within the cross-media publishing industry, digitisation has a considerable **environmental impact** by eliminating production and logistical processes that are rather burdensome in terms of sustainability. On the other hand, digitalisation entails considerable ecological costs (from the source of 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 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 dimension: impact on sustainable consumption of goods and services. It should be emphasised here that the environmental impact did not emerge as relevant and, therefore, it has been not included in the areas of impact analysed.

1.2 Data gathering and analysis

As extensively reported in D2.3, the methodology has defined four impact areas related to 12 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 data without losing meaningful information. A mix-method approach will be followed, 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 hold 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.

The plan for the general evaluation and the impact assessment of the Möbius outputs follows the three Pilot Phases described in the DOA: **Pilot Phase 1** (PP1) running form M9 to M12; **Pilot Phase 2** (PP2) running from M13 to M18; **Pilot Phase 3a** (PP3a) running from M19 to M30 and Pilot Phase 3b (PP3b) running from M31 to M36 (see Figure 3). PP3a consists of collecting data on the general user evaluation and impact assessment of the Möbius outputs, while PP3b mostly consists of demonstration of the Möbius experiences at different events.

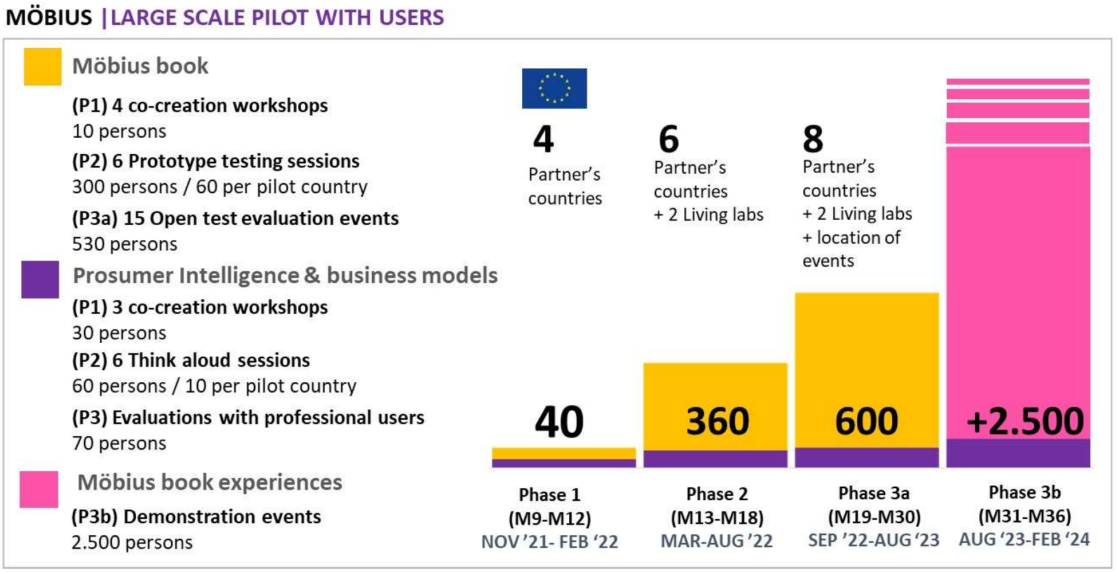

Figure 3. Möbius large scale Pilot Phases

Data collection and analysis have been carried out for every Pilot Phase separately. As the methodology has been designed as an iterative process, the challenges and lessons learned from every Pilot Phase have guided the next one. Furthermore, it should be noted that data collection has followed the guidelines set in D1.2 (Protection of personal data) and D1.3 (Ethical requirements for human participation in research). Finally, as explained (for Creator

and Player) in D4.5 "Möbius Book Final Prototype", the feedback obtained through the surveys, workshops and interviews was converted into updated user requirements so technical partners could easily implement the feedback. These were organised by feature and by category in a user requirements document accessible on the project's SharePoint. After PP2, the **MoSCoW technique** was used to ensure that partners knew which user requirements were ultimately incorporated into the applications. This technique ranks the requirements into four categories: **must-have** (i.e. from a user or technical perspective these requirements need to be incorporated before the end of the project), **should have** (i.e. from a user or technical perspective these requirements are relevant and might be incorporated if there is still time in the project), **could have** and **won't have** (i.e. these requirements will not be feasible to include in the applications during the project timeline). IMEC, FEP, EUT and IN2 have each ranked these requirements according to this method. These requirements were also constantly updated during the different Pilot Phases with the intention that all feedback was converted into corresponding requirements, leading to a saturation of the requirements. The partners could also make comments on the requirements to provide additional insights on the user requirements or its ranking. The user requirements from Pilot Phases 1, 2 and 3 are all combined and can be accessed in this document on the project's SharePoint, or on the respective Subsections on the Creator, Player, and PIT in Chapter 4 of this deliverable.

2. Assessing Möbius Pilot Phase 1

2.1 Dataset

In this report of PP1, the dataset considered consists of seven verbatim transcripts and six Miro Board written materials produced and collected during the workshops. In particular, the verbatim transcripts of several online co-creation workshops for testing the three outputs of the Möbius project have been considered: two workshops on the Möbius Creator in Italy and Spain; three co-creation sessions on the Möbius Player hosted by Belgium and Germany; two co-creation sessions hosted by Belgium. In addition, specifically for the PIT, there were two co-creation sessions, two in-depth interviews and a drop-off survey, hosted by Belgium. The goal of these focus group activities was to "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)" (D2.3, Subsection 3.1.1). Indeed, each Möbius output was tested with a specific focus group's structure, goal, and target of participants. The total number of participants involved is 64, distributed as described in Table 1 below.

Tool	N. of workshops	N. of participants	Profile of participants	Notes on interests and expertise
Möbius Creator	2	13	Prosumers, professional writers	Small stories and novels from fantasy to thriller; marketing management, communication and media, neuroscience, digital publishing
Möbius Player	3	18	Prosumers, cross-readers, booksellers	Novels, children's literature, thriller, science-fiction, and fantasy; non-fiction specialistic books: history, medicine, and social science
Möbius PIT	2 (+2 interviews + drop-off survey)	11 (+2 interview + 20 drop-off surveys)	Publishers, members of publishers' organisations	Young and small / well-known and large international publishers; computational social science, digital production, contemporary literature, and business marketing

Table 1. Participants in Pilot Phase 1

All the workshops had a similar general structure, composed by collective discussions and co-creation activities, and differentiated for the contents, features and issues implied in each output. The co-creation activities have been done using Miro Board, an online whiteboard designed for collaborative brainstorm-like work. After a first round of ice-breaking and presentation, participants were asked to comment, suggest, or even evaluate on the Miro Board specific aspects of the output's mock-ups and prototypes shown to them (Table 2). Then, the workshop facilitator read or rephrased the resulting considerations for stimulating a discussion.

Möbius Creator	Möbius Player	Möbius PIT
Discussion on current practices as writers and readers	Discussion on reading habits	Discussion on current practices on production, sales, market, distribution
3D Audio experience: feedback on the audio listened to	3D Audio experience: feedback on the audio listened to	PIT-dashboard designing
Dashboard designing	Player Mock-ups feedback	

Table 2. Summary of co-creation workshops' activities

The verbatim transcripts as well as the Miro Board materials are raw qualitative data which require a first data cleaning before starting the analysis. In that phase all participants and affiliations were anonymised.

Before introducing the methodological approach adopted, it is important to highlight that the original purpose of these workshops was twofold. On the one hand, to collect inputs for IMEC's tasks in relation to technical validation and piloting. On the other, to perform the first round of impact assessment. However, the early stage of project implementation limited the possibility to perform a proper impact assessment. Nevertheless, the dataset contains considerations and feedback on the potentialities and criticalities of the outputs, that are relevant for the impact assessment task, especially in informing future evaluation of the Pilot Phases and understanding the expected impacts to be assessed.

2.2 NVivo thematic analysis

The dataset described in Subsection 2.1 has been treated through the NVivo software applying thematic analysis. NVivo allows the elaboration of qualitative data such as interviews, transcriptions, word/pdf documents, images, and audio and video files. The thematic analysis was conducted exclusively based on the words used by the participants, following the procedures analysed in scientific literature (Braun & Clarke, 2006) and adapted both to the impact purpose and the nature of the data.

This approach is composed of sequential rounds of review of the data, considered from different angles, and framed in these six main steps:

1. Familiarisation with new data
2. Generating initial codes
3. Searching for themes
4. Reviewing themes
5. Defining and naming themes
6. Producing the report

In the PP1 impact analysis, the steps have been adapted to the task of collecting evidence about the potential and expected impact of the project according to the interview/workshop's oral transcriptions only and written materials from Miro boards. In particular, three rounds of review of the material have been performed for this purpose, before finalising the present report.

In the first review, all the transcription was coded, isolating sub-phases (ice-breaking, introduction, activity 1, activity 2, etc.). In parallel, bottom-up coding was performed to capture relevant or recurrent topics or controversies in the discussions (especially when different positions emerged around a single issue, e.g. paper vs. digital book), highlighting different positioning and arguments (e.g. pro-paper, pro-digital). At the end of this first round, a "bottom-up codebook" was constructed.

The bottom-up codebook was the starting point for a second review in which the IAF is applied as a "top-down codebook" to the material. In particular, in the second review, the transcriptions were examined again for identifying the most relevant phrases (references) concerning the impact areas, dimensions, and indicators established in the IAF. Looking at the distribution of references collected in the "top-down codebook" it is possible to have a first insight of which impact dimensions are the densest and which ones are not detected (code with no references identified).

The third round of review is to be considered as a final review of dimensions and indicators, and emerging issues or trending topics examining the previous phase and elaborated during the writing of the report.

2.3 Möbius Creator: results of evaluation and assessment

This section presents the results of the user evaluation and impact assessment of the Möbius Creator. These are based on two online co-creation workshops with 13 participants in total. The general feedback analyses the discussions on content creation practices, feedback on 3D-audio clips, creation of an ideal Creator Toolkit, and development of a dashboard for creation statistics (Subsection 2.3.1).The impact assessment of the tool (Subsection 2.3.2) analyses the social, economic and technological impacts observed.

2.3.1 General feedback

The sessions organised for the Möbius Creator included discussions on content creation practices, feedback on 3D-audio clips, creation of an ideal Creator Toolkit, and development of a dashboard for creation statistics, all facilitated through Miro.

In the first part of the sessions, content creation practices (such as current practices and writing habits) were discussed and distinct differences in how prosumer writers and professional writers approach content creation were revealed. Prosumer writers, who engage in both fiction and non-fiction, often start either from a feeling or with an idea that leads them to search for reliable sources and documentation. On the other hand, professional writers make clear distinctions between short stories and novels, with most starting from a similar creative spark as prosumer writers. In terms of story development, the professional writers shared interesting insights, as well as how they structure their stories. Terms such as *writer-gardener* and *writer-architect* were mentioned, the former begins with a theme and setting and sees where it takes them, while the latter focuses on a more thoroughly structured planning of the story. One participant mentioned that they start from the ending of the story and work backwards, while other participants said they follow the progression of the story and see where it takes them.

Another participant mentioned that they prefer to make a structure of the chapters, outlining what needs to be written in each chapter. In terms of writing tools, they prefer to use both digital and physical tools, where digital editors such as Word and Google Docs appear to be rather popular, as well as traditional pen and paper to be able to write “on the go”. In general, the participants also seemed to be genuinely interested in immersive experiences, especially among professional users.

In the second part of the sessions, the opinions and feedback of the 3D-audio clips were discussed. Users expressed appreciation for the immersive experience facilitated by 3D-audio, especially noting that the narrator’s voice fostered a sense of intimacy with the content. However, constructive criticism also surfaced, highlighting areas for improvement. Among the suggestions were desires for more control over audio layers, a more nuanced use of music and sound effects to avoid distraction and to strengthen their impact. Additionally, users emphasised the importance of maintaining a balance in the audio elements, recommending variations in narration voices and the potential for author-musician collaborations.

In the third part of the sessions, participants were asked to envision an ideal Creator Toolkit, including various features aimed at facilitating collaborative content creation. Their feedback included the integration of content banks, diverse narrator voices encompassing various accents, project-sharing functionalities to facilitate collaboration, synchronisation capabilities across multiple sources, direct audio recording within the Creator application, track editing tools, EQ-functions for fine-tuning audio frequencies, tools for analysing word and phrase usage, document management systems, and image-to-text linkage features (Table 3). Questions were raised about the uniqueness of content as a result of the implementation of content repositories, as well as the role of the application in visual and audio development. The participants noted that although they are not looking for a new application to write and edit their stories, the options of adding other elements to the stories and collaborating with other creatives were well received.

Feedback ideal features Creator toolkit	Description
Content repositories	Stock banks filled with images, SFX, videos and music, available for the users.
Narrator voicing	It would be an interesting feature to include several accents for the narrations.
Share project / collaboration features	Share project with others to co-create and/or receive suggestions and feedback
Synchronise content from multiple sources	Be able to import external audio-visual content and sync this with the author’s text
Recording function	Be able to record audio directly in the Creator application
Edit track’s function	Be able to edit the audio tracks in the Creator application
EQ function	Be able to adjust the frequencies of the audio tracks (i.e., low pass, high pass, etc.)

Metadata search function	Be able to search for metadata in the Creator application
Export format	Be able to easily export content to the correct format
Customization	Be able to customise the tools and interface of the application
Read out loud	Text to speech function that can read the text to the author, easy to check text for mistakes
Repeated word checker	A system that underlines or highlights when you write certain words repeatedly, and offers a synonym
Statistics about word and phrase usage	How often did you use the word: X / how well are your phrases structured, etc.
Document manager	A tool that allows users to easily manage their documents filled with thought, creating the possibility to structure your stories
Image to text link feature	A tool that can checks the text, and compresses it to a few intriguing sentences and displays certain images that fit the narrative, which can be used for promotion (magic button feature)

Table 3. Feedback ideal for Creator Toolkit

In the fourth, and final part of the sessions, a similar approach was used as for the co-creation of the Creator application, where participants were asked to develop their ideal data dashboard to display data about their creations. Suggestions ranged from socio-demographic data to enhance reader understanding, activity insights to gauge user engagement, and features enabling reader interaction and feedback provision (Table 4). Additionally, users expressed interest in personal consumption data, the ability for readers to add music to stories, and tools for exporting references in non-fiction content. Seeing the list of features, it became evident, however, that the participants did not fully understand the purpose of the data dashboard, but nonetheless, valuable insights were gathered for the user requirements.

Feedback ideal data dash-board features	Description
Socio-demographic data	Data about their readers that gives the authors more information about their audience (who reads my books?), can help with promotion
Data insights in the users' activities	Get insight in what content users consume
Consumption info	What parts of a story get the most attention: comments, time spent reading, highlights, etc. This can be useful to see what users like, and can also integrate in a social experience with other users
What emotions are generated	In other applications, users can express their feelings on certain parts of content (Netflix, a tool that allows users to watch content together). E.g., users can express their feelings about a sentence, paragraph, or chapter by tapping an emoticon that captures their feeling

Chat and community	Linked to the previous feature, users would like to be able to consume and discuss content in a shared setting
Feedback tool	A tool that allows users to interact with the author, direct line of feedback
Personal consumption data	Statistics about your reading habits (so, reading other authors' content)
Add music to a story	Readers should be able to add music to a story (not certain why this is mentioned here)
Export references	Be able to export your references and sources (for non-fiction content)

Table 4. Feedback and suggestions on ideal data dashboard

2.3.2 Impact assessment

The results of the impact analysis of PP1 are presented below for every output of the Möbius project. Besides the discussion on the most relevant impact dimensions, the least or not relevant ones are highlighted for improving the next phases of data gathering. Finally, emerging issues and insights are discussed as new potential and not expected impact dimensions that will be considered in the revision of the IAF contained in D2.3. Due to the small number of participants and the dialogical nature of the focus group, it has not been possible to number precisely how many participants expressed a position or another. Indeed, the impact analysis has privileged a qualitative approach focused on issues, questions, meanings, and positions around a specific topic. All the material discussed and interpreted in the following section and summarised in Subsection 2.6, must be considered as preliminary results and input for the next steps of evaluation.

Social impact: Impact on education

According to the analysis, the social impact of the Möbius Creator concerns essentially potential improvements in writing skills. Due to digital innovation, devices and digital tools allow writers and prosumers to modify their workflow in two ways. First, by producing new content in a more flexible way, for instance creating content on the move or changing places of work (thanks to the use of smartphones, tablets, laptops, and other devices). Second, by using a cross-media approach in the design of the outcome. Considering the potential effect of the output on this point, an important aspect is the actual configuration of the creation process. The participants showed a quite traditional way of organising their workflow, using analogical tools and word processing software, and avoiding or ignoring the possibility to update their habits toward innovative solutions. In the description of their actual writing process, they describe two main issues: the balance between constraints (to fit the story within a defined number of pages) and creativity or freedom; and the moral, or the (authorial) message of the story. This second aspect has not been fully treated in the Möbius Creator co-design discussion, but it may be connected to one that emerged on the technological impact of the Möbius Player, discussed below: the possibility of getting the mood wanted by the author.

In terms of perception of the audiobook, participants describe audiobooks in two ways: as promotional tools or as professional outputs. In the first case, they are recordings of small excerpts or chapters requested by the editor to promote the book on social media; in the second case, they are part of full recordings of the book performed by professional actors. In any case, the audiobook format is considered (like the eBook one) as a secondary output after the traditional written book format.

The assessment of the potential impact of Möbius Creator in terms of education must be settled paying attention to a context characterised by values and habits related to the creative process that can undermine the diffusion and usability of this innovation by writers. In this regard, an important aspect concerns the division of labour between writers and editors: improvements of new skills need to be fitted in this relation, especially in the case of audiobook production where different expertise and business models are implied. However, writers seem to be interested in exploring the opportunity to develop new competences thanks to a new connection and interaction with the prosumers.

Economic impact: Impact on cost reduction and on the production process
The audiobook format has been considered with an emphasis on the economic aspects. Audiobooks are, on the one hand, very expensive because they require a professional actor to read the entire book and to be published as audio-files. On the other hand, audiobooks as promotional tools requested by the editor and performed by the author, can be time-consuming.

In this regard, the Möbius Creator, allowing the prosumers' involvement in the audiobook recordings process, can have a positive effect on cost but also time reduction both for editors and writers. Reducing the high costs of professional reading, editors and authors can consider the audiobook format in new ways, as part of the process, and not just as material for promotional purposes. Prosumers' activities can also contribute to promotion in social networks with low expenditure and efforts from the editor's side. Besides, the possibility to connect creators and consumers in a prosumer way, can indeed positively reduce the actual costs of professional recordings.

In relation to the topic of the gap between writers and readers, the idea of a "magic button" has been proposed and discussed not only for knowing readers' behaviour but also for promotional purposes.

"[It takes] the most beautiful sentences, more impactful, more poetic, more interesting, that lead more to the purchase of what you want. It creates an image of the side and gives you a series of images that you can use for your social media, for example, with the quote under a nice picture, but a beautiful photo, that fits with the context and moreover all images that have a visual consistency between them. And that they allow you to use them to promote the novel, so, for example, to have an editorial calendar on social media, or to keep the discussion going on the novel and so on. Which is what I did, only I repeat I did it by hand and with a significant expenditure of time and energy. But if a tool did it all for you it would be very cool".

The idea of a "magic button", although similar to features already available in some devices (e.g. Kindle, Tolino), is worthy to be considered from the writers' perspective as a tool for closing the gap between authors and readers and collecting insights about the public taste on their own works. Facilitating the making of promotional material in quasi-automatic ways can also have an impact in terms of cost and time reduction. The demand of this feedback mechanism has been oriented more toward the creation process, but it can also have an effect on the production process reducing the effort of collecting evidence on the public taste using expensive services (discussed in Subsection 2.5.2).

Technological impact: Impact on the use of technology
The creators were asked to comment and give feedback on the features so far implemented in the Möbius creator as a technological device. The attention was focused on the meaning of "immersive reading" and different positions emerged on the role of multimedia and multi-sensorial experience. In general, the individual nature of the reading experience has been stressed, highlighting the active role of the reader in constructing and imagining the scenes, the atmosphere, the sounds, and the music. The most critical points regard the use of footage, music, and other material from the movie version of a book. Perceived as "embellishing the writing", it can be a boomerang, reducing the reader in a passive and consummatory role. Indeed, another critical point, but less contested than this, is the layer of the reading voice. The expected impact on the use of technology from the writers' perspective has not been fully appreciated in terms of increasing the fruition of the multimedia book experience. Due to the prototype nature of the example shown during the focus group, it is hard to comment on this dimension; in any case, the boomerang effect is worth considering not only in the design of the outcomes but also in their communication and promotion.

2.4 Möbius Player: results of evaluation and assessment

This section presents the results of the user evaluation and impact assessment of the Möbius Player. These are based on three online co-creation workshops with 18 participants. The general feedback analyses the discussions on reading habits, user experience, audio integration, and interface design (Subsection 2.4.1). The impact assessment of the tool (Subsection 2.4.2) analyses the social and technological impacts observed.

2.4.1 General feedback

The sessions organised for the Möbius Player included discussions on reading habits, user experience, audio integration, and interface design.

In the first part of the session, the reading habits of participants were discussed, after having displayed six different pictures of people reading (e.g., reading on a train, in bed, listening to a book while commuting, reading to kids, etc.), which led to an interesting conversation yielding insights about when and how participants read and whether they prefer to read physical or digital books. Participants' reading habits were observed to be predominantly tied to their daily routines, with many opting to read during commuting or leisure time. The convenience of smartphones and e-readers was highlighted, indicating a preference for on-the-go reading due to factors such as portability, storage capacity, and access to a wide range of digital books.

Reading was seen by most participants as a relaxing activity that is enjoyed during the day or before bed, but one respondent mentioned that as life becomes too busy it is no longer a relaxing activity to sit down and read a book. When asked what reading experience the respondents missed from the six pictures displayed, they responded that the consumption of audiobooks and podcasts were missing, as many of the respondents would listen to this type of content while multitasking. Another point made was that reading is also a social experience, which can get lost in the digital world, e.g., in the case of physical books, interactions and conversations about them can spark as e.g., the cover of the book is seen, which is not the case while reading on a smartphone or e-reader.

In the second part of the session, the opinions and feedback on the 3D-audio clips were discussed. The feedback on the 3D-audio clips highlighted several key points. The narrator received mixed reviews, with some finding the voice generic and artificial while others appreciated it. Most respondents thought that the narrator's voice was too generic and sounded artificial, it was too slow, and it was too impersonal. Also, concerns were raised regarding the repetitiveness of sound effects (SFX) and music, their lack of synchronisation with the narrative, and the need for separate volume controls. Some participants also expressed interest in changing the narrator's voice and increasing variety in SFX and music to better match the evolution and mood of the text. Some respondents also saw the opportunity for the format of the Möbius Player to be excellent for people learning a new language, since listeners can read and listen to stories at the same time, and thus learn how certain words are pronounced.

In the third, and final part, the opinions and feedback on the mock-up of the Möbius Player were discussed. The player mock-up received positive feedback on its design and layout, with users appreciating its simplicity and ease of navigation. However, concerns were raised about the number of clicks required to access content and the readability of text on smaller devices. Additionally, questions emerged about the underlying business model, language support, and features such as note-taking, book sharing, and offline access. In general, participants praised the application's design, colour scheme, and integration of all features into one platform. The ability to personalise suggestions and skip preference screens was appreciated, as was the inclusion of book thumbnails for easy navigation. However, there was some confusion about the presentation of the books, in which some respondents thought that the thumbnails reminded them of CDs, which gave them the impression that the stories were audiobooks. Concerns were raised about the readability of text on smaller devices, the clarity of button functions, and the presentation of dates in different formats. Suggestions for improvement included customizable preferences, clearer explanations of features, and options for dark mode and font customization. Users also suggested features such as book sharing, achievement systems, and personalised profiles.

2.4.2 Impact assessment

Social impact: Impact on behavioural change

In the discussion of the Möbius Player, a potential social effect related to the dimension of behavioural change has been emphasised: the accessibility to older adults and people with

disabilities. As described below, options such as font size and light adjustments can indirectly allow or enlarge access to these social categories. A participant proposed to include blind people in co-creation activities, asking them "*how they feel about the language, the sound effects, the music because they feel it very, very differently than we do and I think that would be an interesting approach*". Other considerations regard changes in reading habits enabled by the affordances and devices suggested and discussed, such as: taking notes function, the possibility of sharing quotes or other content with friends; the creation of a database of favourite quotes, etc. An interesting aspect of social reading habits has been proposed: *"exchanges with people who are perhaps already much further along in the subject matter or something like that, I think that's mega too, but that would be more like the scientific part."* Especially in the case of nonfiction essays, these kinds of exchanges can promote a horizontal circulation of knowledge beyond the disciplinary boundaries. Although it has not been fully discussed, the potential of this quasi-scientific side of social reading can also reduce knowledge gaps, promote interdisciplinarity and eventually contrast fake news and misinformation.

Gamification has been recognised as an essential aspect to cope with drop-out and loss of attention in the social reading experience. In the discussion, it has been exemplified by the videogame "Animal Crossing", as a virtual world where it was possible to visit other's libraries and borrow books. Implementing Möbius Player with gamification features can improve user's satisfaction and engagement while staying in the platform. In addition, it has been suggested to pay attention to marginalised groups and their reduced reading capability. Considering specific tools some features like size and light adjustment can be interpreted as the attempt to build a more inclusive and emancipatory digital environment.

Technological impact: Impact on the use of technology

The affordances of the Möbius Player have been judged positively in increasing the understanding of the story through immersive audio. In particular, the sound layers produce an intensification of the mood: "*this sound can also help to transport a certain mood, so that it is made easy for the reader to get this mood as the author wants"*. Achieving the mood desired by the author is positively judged as a way to reduce the gap between author and public. It has also been brought up that immersive reading requires specific settings that differ from one person to another: *"on the train or on the road… I would be too distracted"*. Different opinions were expressed on the audio layers: sound effects are generally welcomed, while music and voice can distract the experience of reading. Nevertheless, listening to a voice speaking foreign languages can have a "learning effect" on the correct pronunciation of the words, without interrupting the reading experience. The potential positive impact on usability has been interpreted in terms of specific tools, such as size and light adjustments, which can be very important for older people or people with reading disabilities (as already mentioned above).

2.5 Möbius Prosumer Intelligence Toolkit: results of evaluation and assessment

This section presents the results of the user evaluation and impact assessment of the Möbius Prosumer Intelligence Toolkit. These are based on two online co-creation workshops, two online in-depth interviews and a drop-off survey. In total, there were 33 participants who tested

the PIT. The general user evaluation analyses current practices, data management, market insights, and business modelling (Subsection 2.5.1). The impact assessment of the tool (Subsection 2.5.2) analyses the social, economic, and technological impacts observed.

2.5.1 General feedback

The sessions organised for the PIT included discussions on current practices, data management, market insights, and business modelling. Two co-creation sessions were held, as well as two online in-depth interviews and a drop-off survey.

In the first section of the session, the current practices of participants were discussed. Based on five topics (production, distribution, market, sales, and other (varia topics)), participants' practices, decision-making processes, how they make decisions and what data they need to make informed decisions, their current bottlenecks, needs, and desires were discussed. During these discussions, the similarities and differences between publishers became evident, which yielded interesting insights into how Möbius PIT could potentially support their daily practices. It was found that market insights, driven by sales data of their products, play an important role for publishers. Sales data is thus influencing various decisions in terms of production, distribution, etc. This data is gathered through external players, such as e.g., Nielsen and GfK, retailers, bookshops, online platforms, etc., thus indicating that publishers have several data sources available to them, but these do not necessarily provide publishers with a full picture of the market, due to incomplete- or difficult-to-verify data or due to costly services to get access to this data. The participants were rather vocal about these data gaps and stressed the importance of a tool that can collect sales data from various sources and present the output in an orderly manner.

Furthermore, insights into consumer data emerged as a crucial aspect for publishers, spanning behavioural, genre-specific, and demographic data. While digital consumption opens new avenues for understanding reader habits, challenges remain in accessing and interpreting this data effectively. This is due to the fact that most publishers cannot collect behavioural data themselves because they do not possess a digital platform such as the Amazon Kindle to collect this type of data, and consumer research is costly and will lose relevance over time, which keeps publishers in the dark when it comes to digital consumption. Publishers also indicated a need for insights into genre-specific data, from which they can get insights into what genres are doing well and thus make informed decisions about their current and future catalogue. They also deemed demographic data beneficial in supporting price-setting-strategies, as depending on demographics such as age or location of the consumer, the willingness to pay for certain titles or format of books (physical or digital/audio books) may differ.

Finally, the importance of production and distribution data for publishers was highlighted. The need for production data was mentioned several times, involving crucial decisions regarding title selection and print quantities, informed by factors such as historical sales data, comparisons with similar titles, and publishers' intuition. On the other hand, the evolving landscape of book distribution, encompassing both physical and digital formats, presents challenges and opportunities. The shift towards digital distribution, while varied across different

markets, underscores the necessity for streamlined data aggregation. Insights from Danish publishers revealed strategic approaches to digital distribution, leveraging partnerships with aggregators for market-specific models like streaming and lending. The need for centralised data collection tools was emphasised to overcome the fragmentation of insights dispersed across various platforms and partners.

In the second section of the session, a discussion about how online communities' data can be relevant and used by publishers was held (after a brief presentation from David Laniado (EUT)). While opinions on the relevance and correctness of this data varied, several key points emerged. Some publishers expressed scepticism about the value of fanfic data, citing concerns about its applicability to smaller publishers, potential influence on original IP, and language limitations in different markets. Questions arose regarding how this data could inform decision-making processes and drive sales, showing interest in a tool that allows publishers to see the relevance of the (fanfic) data. Additionally, perceptions of Wattpad as a platform for young adults seeking primarily romance and fantasy content were discussed, with participants highlighting differences between Wattpad users and traditional book buyers. The main differences, according to some of the participants, include that Wattpad users and book buyers are interested in different genres, and that Wattpad users expect free content, which is not viable for the publishers. Despite scepticism, recognition was given to the importance of engaging with this younger demographic, as they represent future book consumers. In general, the participants saw the relevance of using fanfic and community data to spot what consumers are talking about and what is popular to read, thus spotting trends. However, they did state that besides fanfic data, they would rather have access and insight into their own communities and build around their IP.

In the third section of the session, an interactive co-creation exercise was held, in which participants were able to develop their ideal Möbius data dashboard. During this exercise, participants discussed what they would expect from their ideal data dashboard, mentioning things such as what it should look like and what features are mandatory. Firstly, there was a consensus on the need for a tool like the PIT to collect digital format data, given the fact that publishers mostly get their data from physical sales, and is delivered by external players, and that even in some cases, relevant data about consumption is not available to publishers due to blackbox operations on platforms such as Amazon Kindle and Audible. Trend spotting and prediction emerged as another key focus, with publishers seeking data to nationalise global trends and prepare content accordingly. Participants also highlighted the importance of consolidating scattered data sources into one dashboard and correlating metrics to analyse trends effectively, meaning that the dashboard must also be able to receive data from sources aside from fanfic communities and websites. Social interaction tracking and engagement measurement were deemed essential for understanding community dynamics and predicting trends. The features that came up in the discussions as necessary include (1) an index feature that displays the engagement ratio between the content and the readers, how often the IP is discussed, and how long the interactions are; (2) the ability to track online conversations via charts; and (3) the ability to see past interactions which can help predict future trends. Additionally, participants expressed interest in insights from platforms beyond publishing, such as Netflix, despite concerns about major media outlets controlling too much of the content.

In the fourth, and final, section of the session, participants were asked about their experience and opinions on certain business models (as presented by Olivier Braet (IMEC)). There were varying levels of interest among participants regarding the presented business models, but a lot of interest could be found in models such as social interaction dimensions, modular publishing, and offering bonus content after the publishing of a book. The business models presented included ad-based, freemium, subscription-based, streaming, lending, premium content, and bundle sales models. The ad-based model, common in social media and content platforms, was unanimously dismissed as impractical for publishing due to concerns about disrupting the reading experience. Subscription services, exemplified by platforms such as Skoobe in Germany that offers +60,000 eBooks starting at €11,99 per month, showed promise but were seen as less mature in the publishing industry compared to other sectors like television and film. Currently, streaming services use back-end catalogues where all content is equal because it is all available for a fixed price. Participants agreed that streaming services will generate good revenue in general, but that the revenue per single title will decline. Premium content offerings, including limited edition physical books and bundled sales, were considered viable options for generating additional revenue, but concerns arose regarding consumer expectations and preferences. In terms of freemium and sample models, participants did not like the idea of giving content via ads, however, most publishers already offer samples in attempts to convince potential customers to buy a certain book, which is done through their own (digital) shop or via Amazon (if they publish through there). From the discussions, it can be seen that there was a prevailing conservatism among publishers towards innovative revenue models, particularly in experimenting with fanfic and opening up the copy-right barrier, which did not seem to resonate with a majority of the participants.

The in-depth interviews and the results of the drop-off surveys are explained in detail in D3.5 "Final Report on Prosumer Business Models, cross-sector scalability and IP Framework".

2.5.2 Impact assessment

Social impact: Impact on knowledge production

“Establish the current practices, likes and dislikes of current data access or lack thereof” (D.2.3. Section 3.1.1.) was the main purpose of the Möbius PIT workshops. In the analysis, current alternatives or similar technologies have been discussed in order to explore the potential and compatibility of the Möbius PIT. In terms of knowledge production, the situation of the publishing sector has been described by the participants focusing on economic and technological implications. Among them, the most iconic object of criticism is Wattpad. It has been described by some participants emphasising its negative side, which concerns the quality of writing (mainly in global English), the age of the common users (teenagers) and the social media affordances that stimulate a parcellation of the writing: *“you can have likes and you can like every chapter separately. So, people basically just figure out that they just have to write a few 100 words per chapter”*. Wattpad, with its positive and negative aspects, represents an important reference for designing the Möbius PIT and to foresee its potential impact in terms of knowledge production. The challenge highlighted by the Wattpad case is to promote high standards of writing through an engaging digital interface and affordances. Indeed, the Möbius

PIT can have a potential impact on knowledge production, becoming a new benchmark in the prosumers community and establishing new creative practices with high standards of quality.

Economic impact: Impact on organisational practices

Wattpad has been looked at as a particular case of a platform structured on the value of "free reading" ("people don't want to spend money for reading") which has no economic relevance for publishers, investors, and professional writers. Nevertheless, its success in the community of prosumers is noteworthy and it cannot be underestimated. Indeed, many criticalities affect the publishing sector, from printing costs to the presence of big companies, and the distribution of physical books to booksellers. Printing costs have been defined as *"so high and exploding at the moment, so that not everything is possible"*. This makes the collection of data regarding trends of the market very urgent and crucial: knowing where the readers' taste goes can be a proxy for future best-sellers. But, as one participant emphasised: *"it's not a perfect market in the sense that the customer is not the one who decides what's in the bookstore, the booksellers decide and the booksellers are not motivated automatically by what their audience would want to buy, but it's more like what do the large companies in the market want to sell"*. Small publishing companies with low budgets for marketing and promotion try to cope with this unbalanced competitive situation by emphasising social media communication. Another strategy identifies the benefits of the eBook format in relation to the price of the book, but the role of the eBook in comparison to the paper edition which is the real meaning of the book is controversial. Indeed, the eBook format is perceived as strongly related to the printed edition, e.g., arguing for pros and cons of publishing it before the latter or as a digital edition, without considering it as an autonomous medium with its own potential.

At this stage of development, it is not easy to foresee how Möbius PIT may impact on organisational practices. Nevertheless, considering the arguments and topics that emerged in the discussion, it is possible to identify two possible challenges in relation to this dimension of economic impact: overcoming the free reading culture promoted so far by prosumer platforms like Wattpad; mitigating the influence of large publishing companies, which are able to orient tastes and make trends, and promoting a more liberal circulation of books in the market.

Technological impact: Impact on data usage and the use of technology

Knowing the customers and their taste is essential for every business including publishing. This has been strongly affirmed by the publishers involved in the focus groups, which describe their current use of data collection relevant to the publishing activities. In particular, dashboards such as Media Control (a company that sells sale figures from booksellers to publishers in Germany) are considered as common tools, although expensive, to have a measure of the common trends and sales. Nevertheless, data on micro-genre can be uneasy or impossible to get. For this reason, Möbius PIT can have a potential impact on data usage making at the same time more economically affordable the process of data usage and reducing the influence of the major dashboards in the creation of new trends.

One of the main difficulties detected by the participants is to express ideas or suggestions on the basis of an output only partially developed. In the design of the toolkit, a basic difficulty has been stated: *"it's at the moment too theoretical to be practical (...) because the first thing for*

me would be the content, not the look or the user experience". Although the idea to collect and connect data encountered huge interest and curiosity in many respondents, there is the need to see the tool ready for testing and being applied in established workflows or situations.

2.6 Final remarks

2.6.1 Final remarks on general feedback

The sessions for the Möbius Creator, Player, and PIT delved into various aspects of data management, user experience, content creation, and feedback mechanisms.

In the Möbius Creator sessions, discussions highlighted differences between prosumer and professional writers' approaches to content creation, with preferences noted for both digital and physical writing tools. Feedback on 3D audio clips centred on desires for more control over audio layers and nuanced use of music and SFX. Envisioning an ideal Creator Toolkit, participants suggested features like content banks, diverse narrator voices, and collaborative tools. Questions were raised regarding content uniqueness and visual/audio development, reflecting the participants' keen interest in refining their creative processes. During the discussion on data dashboards, participants outlined their ideal features, suggesting socio-demographic data, activity insights, and reader interaction features to enhance their understanding of audience preferences and behaviours.

During the Möbius Player sessions, participants shared their preferences for digital reading due to its convenience, though some lamented the absence of social aspects and ambience found in physical books. Feedback on 3D audio clips varied, with participants offering constructive feedback on the narrator's voice and the synchronisation of SFX with the narrative. Suggestions for improvement included customisable preferences, clearer explanations of features, and options for dark mode and font customization. Additionally, features like book sharing were proposed to enhance user engagement.

In Möbius PIT sessions, participants emphasised the critical role of market insights and consumer data for informed decision-making, particularly highlighting the challenges in accessing and interpreting digital consumption data. They discussed the significance of behavioural, genre-specific, and demographic data, recognizing the need for tools like Möbius PIT to collect and organise sales data from multiple sources effectively. Moreover, discussions unfolded around the relevance and scepticism towards online communities' data, such as fanfiction platforms like Wattpad, with participants acknowledging the importance of spotting trends while expressing reservations about certain aspects. Despite occasional misunderstandings, these sessions yielded valuable insights into user requirements and preferences across all applications.

2.6.2 Final remarks on the impact assessment

In the preceding sections the potential and expected impacts that the Möbius project will have according to the Impact Assessment Framework were discussed. The impact assessment areas that emerged as most relevant during PP1 are technological, social, and economic

impact. Five dimensions have been highlighted as relevant; the results are summarised here for the benefit of the next Pilot Phase, informing both the data gathering and analysis as well the whole Möbius project.

Technological impact

Impact on Data Usage
The Möbius project, in particular thanks to the PIT, is expected to have a positive impact on data collection/sharing practices to overcome the current distortion of the market and to reduce knowledge gaps between all the actors involved in the field: writers/prosumers, publishers and readers/consumers.

Impact on the use of technology
In the discussion on the interface and the affordances implemented by the Möbius outputs, the potential "boomerang" effects caused by cross-media overload (e.g. movie frames or soundtrack can distract the readers) has been brought up. The Möbius project is expected to enlarge and propose an immersive experience but also to leave the end-user the possibility to have an intimate experience, not contaminated by other media productions.

Social impact

Impact on social Inclusion
Two main aspects have been emphasised in terms of the social impact: the strong attention toward the engagement of specific groups of people, not as end-users but also as legitimate participants in the co-creation activities because of their disabilities or difficulties in reading, and the "learning effect" of foreign languages' audiobooks. Considering these two different issues together, the Möbius project is expected to promote social inclusion for marginal groups, extending the target of potential consumers/prosumers and reducing the knowledge gap.

Impact on behavioural change
Two sides of engagement have been pointed out: a gamification approach for contrasting dropouts, and a social network approach for reducing knowledge gaps (between experts and non-experts, but also between peers). The Möbius project is expected to become a digital environment, well-balanced in terms of recreation (gaming) and emancipation (education).

Economic impact

Impact on cost and time reduction
For editors and writers, the involvement of prosumers in the creation of audiobooks, by-passing professional and expensive readers can reduce cost and time, and can enhance promotional activities on social media. Similarly, Möbius infrastructure can have a potential impact on access to data (on sales, trends, and readers' tastes) which is a key feature for publishers, reducing its cost, by-passing large and quasi-monopolistic companies in the sector.

2.7 Methodological considerations

The Impact Assessment Framework delivered has been applied to PP1 to evaluate the current stage of project development. At the moment, it emerges that the technological implementation was too premature to conduct an evaluation on the usability of the outputs. To overcome this shortcoming, the first evaluation has been used to perform an analysis of the most relevant impact areas that emerged from the first interaction with the stakeholders engaged in the workshops. Accordingly, it is possible to say that the dimension related to environmental, and sustainability did not emerge in the conversation. It is possible to assume that, given the early stage of the project outputs, it was too difficult for the stakeholders to see impact on this specific dimension. On the other hand, social, economic, and technological impacts have been possible to monitor.

In particular, the stakeholders have clearly understood the value of project outcomes in solving two issues related to social aspects: 1) targeting social exclusion by making possible for vulnerable groups to access reading; 2) increasing engagement in sharing the reading experience thanks to the innovation proposed by Möbius.

In terms of technological impact, professional users have validated the potential of the PIT in providing better access to data that is not accessible so far, informing the value chain and sales. Also, the solutions proposed by Möbius are welcomed to improve immersiveness, leading the prosumers in changing their habits and adopting a technology that can amplify the reading experience.

Regarding economic aspects, the project is expected to have an impact on cost reductions by involving prosumers in the creation of audiobooks and in the promotional activities in social media. From the publishers' point of view, Möbius can also reduce access costs to databases on consumers' taste, book sales, and emerging trends in the market.

In terms of the general evaluation of the applications, it was found that participants saw benefits with the applications and toolkits as developed within the project. During the co-creation sessions, several suggestions for improvement were made by participants in terms of how the applications can improve and better suit their needs and preferences.

2.8 Next steps

In addition to the comprehensive analysis of the PP1 results, the insights from the evaluation were communicated to the consortium. These insights were presented and discussed collaboratively, and towards the transition to PP2, bi-weekly meetings were scheduled to maintain close collaboration with the main technical partners, EUT and IN2, ensuring that progress was effectively tracked and aligned.

Looking ahead to PP2, the plan is to perform another round of analysis checking if the dimensions reported so far are still valid. Considering that there will be a technological improvement, particular attention will be placed on two elements: (1) on the dimensions that have not emerged so far to see if additional impact dimensions will emerge as relevant and (2)

on the dimensions validated during the first round to see if and how they change in the second and third round of evaluations, following the technological development of the products.

Indeed, the impact assessment for the Möbius project has been constructed as an iterative process which evaluates a precise moment of technological development but also informs the next stage of technical improvement. This means that the impact assessment should be considered as a self-reflective tool that can help the project to reflect on the outputs while the project life cycle is accomplished. Clearly, the current report sets up the baseline for the evaluation of PP2 and the same will be done for PP3. However, the aim is to conclude PP3 with a proper estimation of the impacts of the Möbius outputs and to inform sustainability and exploitation strategies.

The feedback received from PP1 was converted into user requirements. These were then passed on to the technical partners to optimise the applications. The user requirements from PP1 will be supplemented with the user requirements from the subsequent phases, i.e. PP2 and PP3.

The user requirements from Pilot Phases 1, 2 and 3 are all combined and can be accessed in this document on the project's SharePoint, or on the respective Subsections on the Creator, Player, and PIT in Chapter 4 of this deliverable.

3. Assessing Möbius Pilot Phase 2

3.1 Dataset

The report for PP2 is based on the analyses conducted by DEN on the data collected by IMEC through surveys and interviews from April 2022 (M13) until September 2022 (M19). Each output has been investigated with a mixed-method approach, combining qualitative and quantitative research tools. Data gathering has been conducted by IMEC leveraging on materials and tools developed and agreed with DEN. In particular, during the planning phase of PP2, DEN and IMEC have collaborated to include in the interviews and surveys all the questions raised by DEN to respond to the impact assessment needs.

Participants varied depending on the kind of output required. To provide an overview of the main participants, these are mainly professional and amateur writers, self-published authors, readers, and publishers from 14 European countries. Information about the audience and the outputs is reported in Table 5.

Output	Dataset	Type of data	Number of participants	Type of participants	Countries
Möbius Creator	Open and closed questions	Qualitative and Quantitative	12	Professional writers Self-published author Amateur writer	Germany, Italy
Möbius Player	Open and closed questions	Qualitative and Quantitative	266	End-users (readers)	Belgium, Spain, Finland, Poland
Möbius PIT	Online interview report	Qualitative	32	Publishers	Denmark, Greece, Austria, Estonia, Ukraine, Germany, Slovakia, Ireland, Poland, Portugal, Italy, Finland

Table 5. Dataset and participants of Pilot Phase 2

Creator

The consortium partners MVB (Germany) and Bookabook (Italy) have conducted tests of the Creator toolkit in an online environment with 12 participants, with a follow-up quantitative survey with open and close-ended questions. Participants performed tasks with the first prototype (a web-based app) and, a few weeks later, they were invited to fill in the survey.

For the impact assessment analysis of the Creator toolkit, the following areas and dimensions emerged as the most relevant:

- Social impact: impact on education
- Economic impact: impact on cost reduction and on the production process
- Technological impact: impact on the use of technology

Player

The test of Möbius Player involved 266 participants from Belgium, Spain, Finland, and Poland. The piloting activities were organised and carried out by IMEC, ENoLL, Laurea and KPT respectively. Each partner followed the same testing protocol, developed by IMEC. A mixed method approach was used, where participants could briefly test the first prototype and experience the app's interface and the first immersive story. After that, they were asked to fill a survey with open and close-ended questions. Regarding the setup, the player application and survey were identical for all partners. Slight differences occurred in the execution of the tests, due to time constraints and different workflow between partners.

- First, in Belgium and Spain, participants were randomly selected on the street, where people were asked if they were interested in testing the Player. Due to this setup, the testing sessions were rather short, but this was intended by the researchers. By using a tablet (iPad) and a wireless headphone, the participants were able to easily explore the application and experience the first Möbius immersive story. After the participants explored the application and Möbius experience, they were guided through a survey by the researchers

- The Living Labs in Poland and Finland used a different approach. This is due to their workflow and operating as Living Lab facilities. In these countries, calls for participation were sent out after which, on agreed dates, the participants tested the Player application (on tablet or computer), followed by the same survey. Both external partners collected the necessary feedback and delivered results to IMEC.

In the impact analysis of the Möbius Player, the following areas and dimensions emerged as relevant and have been examined:

- Social impact: impact on behavioural change
- Technological impact: impact on the use of technology

PIT

The PIT first mock-up (web-based) has been tested by 32 participants (publishers) in a 30-minute online individual think aloud session and interview. During the session, participants were introduced to the mock-up, going through the different tabs, and answering questions, giving their feedback and opinions. IMEC prepared a proper interview protocol involving the setup and questions; some of them have been developed on the bases of the Impact Assessment Framework (D2.3). In relation to the PIT, the following impact areas and dimensions emerged as the most important ones to be discussed:

- Social impact: impact on knowledge production
- Technological impact: impact on the use of technology and on data usage

3.2 Analysis

As anticipated, all the data were originally collected by IMEC and consists of Excel and Word files with a database with open and close ended questions, and partial transcripts of the interviews. While the analysis performed by IMEC was focused on the evaluation of the

features developed for the next phase of prototype development, in the impact assessment a part of the information gathered which contains insights on the potential and expected impact of the outputs was analysed. Indeed, the same data were analysed, but from a different perspective and purpose, emphasising social, economic, technological, and environmental change promoted or enabled by the Möbius project.

It was decided to use quantitative closed questions on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). This allows us to quickly compare different items and observe the different distribution of responses. In the analysis conducted directly on the Excel files, together with the mean value, the distribution of the responses has been considered in order to identify potential polarizations (e.g., “strongly disagree” and “disagree” are considered together as negative responses, and “strongly agree” and “agree” as positive responses).

The analysis of the qualitative dataset (open questions) has been implemented through the NVivo software, applying thematic analysis. The thematic analysis was conducted exclusively based on the words used by the participants, following the procedures depicted in the literature (Braun & Clarke, 2006) and adapted both to the impact purpose and the nature of the data (Subsection 2.2) .

3.3 Möbius Creator: results of evaluation and assessment

This section presents the results of the user evaluation and impact assessment of the Möbius Creator. These are based on surveys that were completed online by 12 participants after being guided through a manual explaining the application. The general user evaluation analyses the participants' user experience with the app (Subsection 3.3.1). The impact assessment of the tool (Subsection 3.3.2) analyses the social, economic, and technological impacts observed. In the survey with closed questions, participants could indicate via a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) to what extent they agreed with certain statements. In total, 12 people filled in the survey, which means that the mean value indicated for each aspect is the average of all (12) scores indicated by the participants.

3.3.1 General evaluation of tool

In the Creator's analysis, the answers to the open and closed questions are discussed together so that a comparison between the two can be achieved.

Interface of the application

Participants generally found testing the Creator app enjoyable (3,5/5) and as an interesting experience. However, improvements are still needed in terms of the intuitiveness of the app (3,1/5) and the ease of use of the app (2,8). The non-intuitiveness of the app was also mentioned by two out of 12 participants in the open questions. One of them was referring to the application as a whole. As a result, the app was considered by this participant to be too complex and user-hostile:

> “*The programme [app] is not the least bit intuitive. Too complex. Too complicated. User-hostile.”* (Quote from participant in survey).

The other respondent was a little more specific about what was not intuitive. The participant mentioned that the linking to the external content was not intuitive:

> *"The linking is also not intuitive."* (Quote from participant in survey).

The user interface design also has room for improvement. One respondent pointed out the design as a weakness:

> *"UX design seems to be a general weak point."* (Quote from participant in survey).

Another respondent found the design too sober:

> *"The design is still very simple, of course there should be no overloading of your own content, but it still feels a bit sober/emotional."* (Quote from participant in survey).

A possible explanation for the lower evaluation of the ease of use of the app, could be due to the terminology used. One respondent found that the terminology was sometimes inconsistent and that it was not clear what certain links and functions meant:

> *"Terminology is sometimes inconsistent. Post, notes, description, unclear what they mean."* (Quote from participant in survey).

The need for a clearer terminology was also shown in the closed questions. The scores on understanding the meaning of a story (3,0/5), a collection (3,1/5) and the purpose of the "call to action" (3,2/5) were on the low end.

Book creation tool feedback

In terms of the book creation process, steps can still be taken forward. Participants in the closed questions indicated that creating chapters (3,4/5) and certainly books (2,8/5) did not go smoothly. More user guidance could be a solution to this as one participant of the open questions mentioned the lack of it:

> *"Overall, I was rather confused by the lack of user inside guidance. Without the instructions, I would not have gotten any further, so I left it for a while after the first attempt."* (Quote from participant in survey).

Based on the closed questions, participants were not satisfied with the ease of integrating text files (3,2/5) to a chapter. In line with the ease of integrating text files to a chapter, one respondent of the open questions found it strange that text had to be uploaded via a Word file. This reduced the ability to introduce changes to the text. Thus, other options should be considered:

> *"I found the upload of text via a Word file very strange, as I was less able to incorporate codes and changes afterwards."* (Quote from participant in survey).

Another respondent mentioned using a rich text editor for editing chapters:

> *"I would find a rich text editor for editing the chapters useful. This could work with Git-flavoured Markdown, for example. Otherwise, I recommend Quill.js as an open-source WYSIWYG editor."* (Quote from participant in survey).

This respondent pointed out that it is only possible to add a limited amount of text to a chapter. People who want to add large amounts of text to a chapter are thus discouraged from using this application:

> *"I could not add a longer text to a chapter."* (Quote from participant in survey).

Analysing the closed questions made it clear that integrating audio files (3,0/5) to a chapter should be made easier. Also, one respondent from the open questions, made it clear that there was some difficulty with creating soundtracks:

> *" ... background music before or during the chapter would be most interesting, but that didn't work. I couldn't test properly as I have no way to create soundtracks or find them for free in the tool."* (Quote from participant in survey).

This respondent would find it helpful if there were free soundtrack samples:

> *"There should be a database of images and audio."* (Quote from participant in survey).

This thought was shared by another respondent, who asked for a database of audio:

> *"There should be a database of images and audio."* (Quote from participant in survey).

The poor lay-out for integrating audio files was also mentioned by another respondent because of the impossibility to include more than a preview of the audio file:

> *"... but with the audio file, I could also only include a preview, but not the sound itself."* (Quote from participant in survey).

The closed questions also indicate that respondents did not find it easy to integrate CTA-links (2,9/5) to a chapter. Also, one respondent of the open questions stated that there should be a simplification of the integration of CTA-links:

> *"Perhaps the integration of the CTA link could be simplified a little more."* (Quote from participant in survey).

According to the closed questions, uploading images to a chapter was judged as positive (3,5/5). However, three respondents from the open questions mentioned that when uploading, media became sometimes distorted. One respondent said:

> *"...the media were all jumbled and not enjoyable together."* (Quote from participant in survey).

Another one said:

> *"...but all the individual parts somehow float in space"* (Quote from participant in survey).

According to the third person, it would be helpful if information about pixels/dimensions of the images would be provided:

> *"When uploading the cover images, I was disturbed by the fact that they were totally distorted. It would help to have some information about the pixels/dimensions in advance."* (Quote from participant in survey).

Overall, there was a lot of uncertainty among respondents in terms of layout. Some examples are: unclarity about why previous files disappear when uploading another one, unclarity about why books are next to chapters and chapters next to content and unclarity about why one is required to go out of the book to make chapters:

> *"...furthermore, I am not clear why the previous file disappears when I upload another one...")* (Quote from participant in survey).

> *"Why are books next to chapters and chapters next to content?"* (Quote from participant in survey).

> *"Why do I have to go out of the book to make chapters?"* (Quote from participant in survey).

Publishing a chapter (3,4/5) and certainly sharing chapters (2,7/5) should be made easier according to the respondents of the closed questions.

3D-audio

In terms of 3D-audio, most respondents indicated in the closed questions that they found it interesting to integrate music (3,9/5), a narrator track (4,0/5), or sound effects (3,8/5) into stories; yet 3D-audio is not found to be a critical element in the development of immersive content (3,3/5). Respondents were also neutral about wanting to experiment with integrating 3D audio into stories (3,5/5). A possible explanation can be obtained from the answers to the open questions. For example, a respondent did not really like 3D-audio because it would have a distracting effect on the reading experience:

> *"However, I don't like audio plays because most of the effects distract me, so unfortunately I can't do much with the options."* (Quote from participant in survey).

Production process

According to the closed questions, the Möbius Creator Toolkit would not improve the creative process. Respondents stated that it would not strengthen their digital skills (2,5/5) or writing skills (2,6/5). In terms of cross-media production, the functions of the Möbius Creator Toolkit would not save time (2,5/5) and respondents were neutral about saving costs (2,7/5).

Respondents were also not sure if it would help in improving current practices for cross media production (2,7/5). Also, two out of 12 participants of the open question mentioned they were not sure about the added value of the Möbius Creator Toolkit:

> *"I do not understand the value added by this programme."* (Quote from participant in survey).

> *"It's a mystery to me what use the tool has; immersive eBooks, online content?"* (Quote from participant in survey).

Table 6 below reports the assessment for the closed questions on the Möbius Creator.

Umbrella tags	Feedback
User-friendliness app	• Testing the Creator prototype was enjoyable (3,5/5) • Neutral about finding the Creator application intuitive (3,1/5) • Neutral about finding the Creator application easy to use (2,8/5)
Creating a book	• Neutral about finding it easy to create a book (2,8/5) • Neutral about finding the purpose of the book creation tool clear (3,1/5)
Creating a chapter	• Neutral about finding it easy to create a chapter (3,4/5) • Neutral about finding the purpose of the chapter creation tool clear (3,2/5) • Neutral about understanding the meaning of a story (3,0/5) • Neutral about understanding the meaning of a collection (3,1/5) • Neutral about finding the content page intuitive (2,7/5)
Integrating text files	• Neutral about finding it easy to upload text to chapter (3,2/5) • Neutral about finding it clear that the text files had to be uploaded via the "Post" tab (3,3/5)
Integrating images	• It's easy to upload images to chapter (3,5/5) • It's clear that the images had to be uploaded via the "Media" tab (4,0/5)
Integrating audio files	• Neutral about finding it easy to upload audio files to chapter (3,0/5) • It's clear that audio files had to be uploaded via the "Media" tab (3,7/5)
Integrating call to actions	• Neutral about finding it easy to upload CTA links(s) to chapter (2,9/5) • Neutral about finding it clear that CTA links have to be uploaded via the "Call to Action" tab (3,4/5) • Neutral about understanding the purpose of the "call to action" (3,2/5)
Uploading and sharing content	• Neutral about finding it easy to publish chapter (3,4/5) • Finding it easy to share chapter with others (2,7/5) • The workflow of the creation process is not logical (2,6/5)
Integrating 3D-audio elements	• Neutral about finding 3D audio an important element in the development of immersive content (3,3/5) • Neutral about willing to experiment with integrating 3D audio into stories (3,5/5) • The possibility of integrating music into stories is appealing (3,9/5)

	• The possibility of integrating a narrator track into stories is very appealing (4,0/5) • The possibility of integrating sound effects into stories is very appealing (3,8/5)
Impact on digital skills and writing skills	• Using the Möbius Creator Toolkit will not improve digital skills (2,5/5) • Using the Möbius Creator Toolkit will not improve writing skills (2,6/5)
Impact on cross media-production	• The functions of the Möbius Creator toolkit will not save time for cross-media production (2,5/5) • Neutral about expecting the functions of the Möbius Creator toolkit will save costs for cross-media production (2,7/5) • Neutral about expecting the features of the Möbius Creator toolkit will help in improving current practices for cross media production (2,7/5)

Table 6. Assessment of the closed questions for the Möbius Creator

Table 7 reports the assessment for the open-ended questions on the Möbius Creator, which, based on these insights, were translated into user requirements in the living document:

Umbrella tags	Feedback
Modifications of Creator	Clarification of CTA link • Simplification of CTA link • Unclarity about CTA link Distorted media • Media were jumbled • Individual parts float in space • Mobile view needs to be improved Lack of intuitiveness • Unclear usefulness tool • Linking not intuitive • Functions not intuitive • Design is sober • Database of images and audio should be included • Possibility of narrator reading the story • Pictures should be homogenised with text • Possibility of picture in text and music underneath Using Rich Text Editors • Rich text editor for editing chapters • Using GitHub-flavoured Markdown • Using Quill js Poor user-friendliness • No visualisation of chapter • Difficulty with creating soundtracks • No access to software
Missing functions of Creator	Narrator-audio • Speaker track • Text-to-speech auto-narration • Make the text audio possible for the blind Problems with lay-out • Not able to combine uploaded chapters with photos/videos

	• No possibility to make layout changes • Support for Markdown files when uploading Free samples • Free soundtrack samples • Free image samples
Experience with Creator	**POSITIVE** Possibility of audio • Integrating audio and video • Love audio books • Read track is interesting Quick uploading • Quick uploading Easy insertion of images • Easy insertion of images into text via codes **NEGATIVE** No interaction/engagement • Story is not interactive • Could be more engaging to create video with text and images fading out Poor user-friendliness • User-hostile • Should include information about pixels/dimensions of images • Lack of user inside guidance • Opening pop-up window for adding media too slow • Complex • Complicated • Unstructured • Incomprehensible • Unclear/inconsistent terminology • Unclarity about CTA Poor lay-out • Unclarity about why previous file disappears when uploading another one • Unclarity about why books are next to chapters and chapters next to content • Unclarity about why media are not in navigation • Unclarity about why one is required to go out of book to make chapters • Not possible to add longer text to chapter • Beginning and end were not legible because of centred text on page • Not possible to put screenshot of bike behind text • Impossible to include more than preview of audio file • Distorted cover images when uploading • Strange to upload text via Word file • Unclarity about why cover is displayed in landscape format on PC and on mobile phone in portrait format • Text of chapter should display more links • Weak UX design Lack of intuitiveness • Non-intuitive • Added value of Creator is not clear Distraction

	• Don't like audio plays because of distraction

Table 7. Assessment of the open-ended questions for the Möbius Creator

3.3.2 Impact assessment

In this presentation of the results of the PP2 impact analysis, each output is examined through the Impact Assessment Framework (D2.3). As in the first report, it is important to consider that the quality of the dataset and the analyses conducted here depends on the development stage of the outputs (i.e., prototype and mock-up) and the typology of data gathering tools adopted. This means that only the most relevant impact dimensions and indicators that emerged from the data gathered have been discussed. Indeed, data and evidence on some dimensions in the PP1 report have already been collected, and others will be investigated in the next phase of data collection when the outputs will be more advanced. In comparison to the PP1 report, during the PP2 it was possible to provide some quantitative data, especially in relation to the general satisfaction of the technical implementations.

In the discussion, each dimension, and relative indicators, as defined in the methodological framework, will be briefly introduced, and examined, reporting what was declared by the participants in surveys and interviews. Recurrent themes and relations between impact areas will also be considered and highlighted to compare themes and trends emerged in PP1. Finally, all the evidence here discussed in detail will be summarised and condensed in Subsection 3.6 as preliminary impact assessment results for this stage of project development.

Social impact: Impact on education

As described in D2.3, impact on education is a social impact dimension that includes digital skills (levels of know-how, ability, and awareness in the use of ICT devices) and writing skills of professional and amateur authors. These skill categories are considered in terms of education because digitisation is transforming the output of writing and reading (e.g. eBooks) but also the workflow-experience (e.g., by digital apps and software). In the case of the Möbius Creator, impact on education concerns changes in the skills of the end-users due to the use of the toolkit. In particular, two dimensions are analysed:

- Increase in digital skills for authors and content creators
- Increase in writing skills for authors.

The first one has been investigated in the survey with the question: "By using the Möbius Creator toolkit I will improve my digital skills". The responses are quite negative (50% disagree and strongly disagree) and neutral (41,67%), and the mean value is 2,5/5. For the second dimension the following question was posed: "By using the Möbius Creator toolkit I will improve my writing skills". The mean value is similar (2,6/5) but with a significant 25% of agreement.

It is important to bear in mind that these data refer to a test with a prototype still under development, where participants provide feedback on the many difficulties encountered and coped with during the testing. Despite this preliminary experience with the toolkit, that positive percentage on the increase of writing skills allows us to glimpse a potential impact of the toolkit

at the heart of the writers' activity and expertise: the writing skills. The toolkit, in other words, seems to have a greater impact on the writing rather than on the digital skills enhancement.

Economic impact: Impact on cost reduction and on production process
The economic impact of the Möbius Creator toolkit involves the dimensions on cost reduction and on the production process.

The first dimension refers to the potential reduction of cost (monetary and time saving) at some level of the publishing industry caused by the digitisation and the consequent dematerialization of outputs (e.g., books, flyers) and processes (e.g., promotional tools and materials). In the analysis of the Möbius Creator toolkit two indicators have been considered:

- Cost saving for cross media production
- Time saving for cross media production

The dimension of impact on the production process contains the changes triggered by the use of innovative tools by stakeholders and the flow of data generated by prosumers, which can generate new production and promotion practices, and stimulate collaborations on cross media production. In particular the following indicator was used:

- Change in production practices due to stakeholder use of the tool

The amount of cost and time saving that the toolkit is capable of gaining is difficult to evaluate at the current level of development of the toolkit, which does not yet have well-performing functions. Although all these factors may have conditioned the answers, participants were asked to express their expectations about the functions they have tried. In the question: "Considering the functions I have tried, I expect a cost saving for my cross-media production": the mean value is 2,7/5, with 41.67% disagreeing and strongly disagreeing.

Regarding the evaluation of time saving, in a similar question ("Considering the functions I have tried out, I expect to save time for my cross-media production"), the mean value is 2,5/5, with a higher percentage of negative responses: 58,33% disagree and strongly disagree. One of the main features perceived as time-consuming is the media, especially the audio track management (see below).

Accordingly, there is an expectation that the toolkit can be promising more in cost reduction rather than in time saving. A possible reason for this moderate scepticism in the feasibility of time saving could be explained by the level of digital skills of the respondents.

Regarding the impact on production practices, a partially negative assessment emerged with the following question: "Considering the features I tried, I expect the tool will help me in improving my current practices for cross-media production". The mean value of 2,7/5 with 41,67% negative, 33,33% neutral and 25% positive responses. Despite the relative majority of negative responses, the percentage is relevant and the same as the indicator on improving writing skills. Even though the sample size is very small, there is a strong association between these two indicators: the same participants have expressed the same response "agree" in both

questions. Expectations of increasing writing skills and improving current practices for cross-media production could be interconnected.

Technological impact: Impact on the use of technology

In the assessment of technological impact, technological innovation is examined in its potential change on users' behaviours and awareness in relation to technological productions and resources. In particular, the dimension of impact on the use of technology involves a new understanding of the user experience, in terms of usability but also satisfaction.

The analysis of the impact in the use of technology promoted by the Möbius Creator has been focused on two indicators:

- Rate of satisfaction in using the toolkit
- Usability (easy to use, easy to learn)

The first one consists of an overall assessment of the user experience, as it stands and in its potential; while the usability is intended as an evaluation of the easiness, and intuitiveness in learning and using a set of features.

The first indicator includes subjective evaluations of pleasure and enjoyment in experiencing the toolkit, but also some specific features. To the statement "I enjoyed testing the Creator prototype" 50% agree, while 33,33% disagree and strongly disagree and 16,67% are neutral. In Table 8 below, the appeal of integrating audio features into the stories is presented in detail.

Audio features	*Appeal*			
	mean	**negative**	**neutral**	**positive**
Music	3,9	25	8,3	66,7
Narrator track	4	25	8,3	66,7
Sound effects	3,8	33,3	-	66,7

Table 8. Appeal of Möbius Creator's audio features (in %)

Audio features seem to have a positive appeal for two-thirds of the sample. Negative evaluations are also remarkable, especially for sound effects, which seem to polarise the respondents.

The Creation toolkit is composed of many features and elements which allow the user to create, upload, publish and share content through the application interface. Regarding the usability, this has been measured through several questions, some of them on the Creator in general and others on specific features/elements of the creative workflow, using attributes such as "intuitive", "easy", "logical", "clear".

Intuitiveness, easiness and logical	**mean**	**negative**	**neutral**	**positive**
I found the Creator application intuitive (i.e. a logical workflow).	3,1	**41,67**	16,67	**41,67**

I found the Creator application easy to use.[1]	2,8	**41,67**	16,67	33,3
The workflow of the creation process is logical.[2]	2,6	**41,67**	16,67	33,3

Table 9. Usability of the Möbius Creator (in %)

For specific features and tasks, the term “easiness” (“easy to use”, as the effort in using the tools for completing a task) and “clearness” (“clear to understand”, as the effort in understanding the purposes and functions of the tools), e.g. "I found it easy to create a book", "The purpose of the book creation tool is clear" were distinguished.

Tasks and tools	*Clearness*			*Easiness*		
	mean	**negative**	**positive**	**mean**	**negative**	**positive**
Create a book using Book creation tool	3,1	**41,67**	**41,67**	2,8	**58,33**	33,33
Create a chapter using of Chapter creation tool	3,2	33,33	**41,67**	3,4	41,67	**50**
Upload text to my chapter via the “Post” tab	3,3	**41,67**	**41,67**	3,2	**50**	41,67
Upload images to my chapter via the “Media” tab	4	16,67	**75**	3,5	33,33	**66,67**
Upload audio files to my chapter via the “Media” tab	3,7	16,67	**66,67**	3	33,33	33,33
Publish a chapter	-	-	-	3,4	33,33	**58,33**
Share a chapter	-	-	-	2,7	**41,67**	33,33

Table 10. Möbius Creator’s usability in specific tasks and tools (in %)

Our analysis included some technical evaluations in order to unpack the general statements on usability reported above (Table 9). In Table 10, a different distribution of clearness and easiness within and between tasks and tools is shown. For instance, the creation of a book is not sufficiently “clear”, and it is difficult to be realised using the book creation tool for almost two-thirds of the respondents, while the audio files upload seems to be more clear than easy to implement. Regarding publishing and sharing, the last two activities at the end of the creation process, it is easier to publish a chapter than to share a chapter.

In the development process some elements may work better than others. The analysis shows that things are more nuanced than the general statements may indicate. Negative values on the "easiness" can be interpreted as “complications” in the functioning of the tools, which cause a low mean value in the general statements on usability.

[1] 8,33% non-response.
[2] 8,33% non-response.

Further qualitative comments on this impact dimension emerged in the open questions. The following points summarise the main critical issues:

1. **Learning**: A source of confusion in the user experience regards the lack of instruction and the need for a “cleverly thought-out tutorial or (even better) more intuitive operation” to assist and guide the end-user.
2. **Visualisation**: difficulties in visualising the chapter, testing, and sharing the “finished product”, and a “terminology sometimes inconsistent and unclear” make the creation process frustrating in the writing part. “I found it illogical that you don't work within a book and then not within chapters, but all the individual parts somehow float in space. The linking is also not intuitive”.
3. **Audio management** presents some problems and confusion but also stimulates ideas and interests. Indeed, “the media were all jumbled and not enjoyable together, background music before or during the chapter would be most interesting”. Media integration, “the fact that the texts could be uploaded quickly, and that audio and video files can be integrated” is positively considered. Even those who do not like audio “because most of the effects distract me" believe that “a pure read track is highly interesting”. In general, along with specific criticalities and the remark of being time-consuming (“I didn’t have the time (…) it eats up a lot of time to include larger works in the tool”), experiments with audio stimulate questions for potential uses of audio tracks (“Making the text audio for the blind”) and text-to-speech auto-narration. “Does Möbius have its own text-to-speech engine, from which the resulting audio track could be published elsewhere as an audiobook version? Am I allowed to upload an auto-narrated track? These are questions that I think still need to be clarified”.
4. **Added value**: the sources of the confusion described so far have an impact on the overall value of the Creator toolkit, as expressed by one participant: “It's a mystery to me what use the tool has (immersive eBooks? online content?)”. This kind of perplexity raises questions on the interactive aspects of the toolkit: “I do not understand the value added by this programme. The story does not become interactive. It is more engaging to create a video with the text fading out with images, perhaps a voice reading it and background music”.

3.4 Möbius Player: results of evaluation and assessment

This section presents the results of the user evaluation and impact assessment of the Möbius Player. These are based on 266 filled in surveys. The general evaluation analyses the participants’ user experience with the app (Subsection 3.4.1). The impact assessment of the tool (Subsection 3.4.2) discusses the social and technological impacts observed. In the survey with closed questions, participants could indicate via a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) to what extent they agreed with certain statements. In total 266 people filled in the survey, which means that the mean value indicated for each aspect is the average of all (266) scores indicated by the participants.

3.4.1 General evaluation of tool

3.4.1.1 Analysis of open-ended questions

From the open-ended questions, mixed results were witnessed about the positive and negative aspects of the app, the changes participants would make in the app, and - if they would use and/or recommend the application to others. Overall, the open-ended questions led to feedback of what users expect from the application, which features should be added or removed, how the content should be presented, and more. Here, the most significant feedback to improve the application is presented. In addition, a table per element is shown with a quick overview of changes that should be considered for further progression towards PP3.

3D-audio integration

The 3D-audio is a controversial part of the Player, leading to contradicting responses. Overall, both positive and negative feedback was received. Comments included the narration, SFX, music, and lack of control. Table 11 below presents an overview of the features that participants in the study indicated should be altered, implemented, or removed.

Umbrella tags	Feedback
Sound control	The need for a volume mixer that gives users control over the sound. This for different actions: volume setting, track selection (mute), more control overall.
	Forward and backward buttons. Users expect a function to jump back and forward in the text. Other applications (i.e., Spotify, YouTube, etc.) also have this feature.
	Play back paragraphs, meaning that there is a button/function that allows users to play back the last paragraph.
	Speed of the audio. The app doesn't have the option to increase the speed of the audio (story)
	Quick action/button to disable the audio. Some users didn't appreciate the audio.
Audio content	The audio (SFX / music / narration) is boring and monotonous (by some users). Yet, this isn't a technical issue that can be solved by the IN2, but rather a content issue
	The narrator was boring, stale, and overall, not pleasing for some users. This raised the question if it is possible to change the narrator's voice. Again, this isn't a technical issue, but rather content related.
	The SFX and music tracks weren't pleasing to all users, therefore, the question of the possibility to change SFX and music tracks was asked. Again, this is a content issue.
	Overall, users mentioned the lack of quality audio in the application. Meaning that the audio is received rather negatively by numerous testers. Yet, improving control over the audio tracks could improve the overall connotations towards the audio.

Audio story integration	The audio needs to be continuous throughout the story. Numerous users raised this as a necessary feature, to not be redirected out of the story, and therefore, being 'pulled out' of the story.
Feelings and opinions	Too noisy
	Audio wasn't clear
	Monotonous and boring
	Narrator (muffled, annoying, slow, boring, etc.)
	Audio doesn't match the story

Table 11. Feedback on 3D audio in the Player

In general, the audio improvement should focus on control and available content (i.e., audio tracks: narrator, SFX, and music). First, control in the form of a mixer with basic features such as volume adjustment and the option to mute channels, will be a big improvement for the application and the user-friendliness. By the additional control, users can decide what tracks they would like to listen to, the level (loudness) of the tracks, and in general, the option to mute tracks. Second, the content (i.e., narration, SFX, and music) available in the story, users expect more options (i.e., different audio tracks), and more variation in the tracks, else the story gets monotonous and unpleasant to listen to. Although this isn't a technical feature, but rather a content issue, users expect more than one narration voice and more variation in sound effects and music. Lastly, the audio should be continuous, meaning that the immersive links should not redirect the users to a different page, automatically stopping narration (see also below).

Multimedia content redirection

During the testing, users experienced a first glimpse of the Möbius immersive book experience. As mentioned in the evaluation of the 3D audio; it became clear that users didn't appreciate the redirection out of the story once they clicked on the buttons (immersive links). The audio stops playing, and the application opens a new page that displays the visual element(s) (i.e., image or video). The nature of the additional content was perceived as positive by a set of users, but the redirection is seen as distracting and pulling users out of the story (Table 12).

Umbrella tags	Feedback
Content redirection	The audio needs to be continuous throughout the story. Numerous users raised this as a necessary feature, to not be redirected out of the story, and therefore, being 'pulled out' of the story.
	Better switching mechanism between the links and the book (meaning that the redirect needs to be smoother, or the media has to be integrated in-text)
	The audio must play back from the part where the user clicked on the link, meaning that the audio/story remembers where you left the story to see the immersive content
	Integrate the immersive content into text, therefore, avoiding the redirection, and breaking the story
	Add a preview (button/windows) of the immersive content that will be presented once the users click on the links. This can give users the chance to see

	a glimpse of the added content and decide whether they like to see the content - or not.
	Add another tab where users can access the additional content of the story.

Table 12. Feedback on multimedia content redirection in the Player

Interface and user experience

From the participant's experiences, it became clear that even small features, such as a missing back button, influenced the users' experience and the user-friendliness. Table 13 below gives an overview of the user feedback on both the user experience in general, the user interface and specific features.

Umbrella tags	Feedback
Account and personalization	The need for users to create an account can be a threshold for potential users that don't want to create an account for the application.
	Users expect more personalization options (i.e., genres). Yet, more insight wasn't given concerning this topic.
	Decide in the settings what sort of links will be available/seen in text (e.g., you can decide not to see the links redirecting to videos)
Layout	The app is too bright and there is no dark-mode feature
	More modern layout overall
	The book covers don't share similar dimensions (width and height).
	Option to change the background of the application
User experience	It is hard to navigate the application (i.e., also missing buttons).
	Not accessible for visually impaired users
	Need for content in different languages
	The combination of audio and text can be distracting or overwhelming for some (i.e., this is also related to other comments).
	Overall, more intuitive experience.
	Fewer steps to login and select content.
	Add the necessary features that make the application easier to use (i.e., home, and back buttons, etc.)
	Book flip, tap on the book cover and get additional information (i.e., genre, author, year, etc.)
Social dimension	Users see the appeal to be able to log in through their social media accounts
	The possibility to interact with other users on the application.
	You cannot see what other users (friends) are reading.
	Recommendation feature for your network (recommend books to friends -or get titles recommended to you based on your network).
Search function	A search function (search bar) to find specific books

	A search function (search bar) to find books with specific genres, author(s), etc.
	A search function to search for content (words, media, etc.) in the books
	A search function to search for specific additional content (multimedia content added to the books)
Content	Users need more content and genres to use/test the application
Feelings and opinions	Good user experience / bad user experience
	Very logical application
	Good layout
	Easy to use

Table 13. Feedback on interface and user experience in the Player

Readability and reading experience

Closely related to the user experience, is the readability and reading experience of the users. The readability is also closely related to the experience and integration of additional content of the story, and how the content should be presented (Table 14).

Umbrella tags	Feedback
Reading experience	Overall, the current reading experience needs to be improved.
	Allow the option for 'normal' reading, mimicking the eBook experience, without the added multimedia features (e.g., Kindle).
	The text should follow the tempo of the narrator (highlighting).
	Need for a bookmark function
	Need for page breaks in the books
	Can't select text in the book
	The audio stops playing when you click on the links (redirection), either the audio continues and the img./vid. should be in the text. Or the audio should play from the section the user left the page (redirection)
Fonts	Allow the users to adjust the font size, colour, and background (more options for personalization)
Library	The books don't resemble a library feeling, this should be improved
	No indication of what types (genres) of books are available in the library
	The books don't display the genre, author, number of pages, etc. (this could be fixed by a feature that if you press -or double tap on the book, it displays additional information)
	Add a page that displays the books you already read
	Add a page that displays the books you are currently reading
	Option to rearrange the books in the library
Notes	Note-taking feature (in the book)

	Feature that allows users to highlight or underline sections of a book
	Feature that allows users to doodle in the book (pencil function)
	Option to select text
Feelings and opinions	Unique and interesting experience
	Very logical
	Fun reading experience
	New take on audiobooks
	Good for multitasking
	Low effort to consume books
	Combination of audio and text is fun

Table 14. Feedback on readability and reading experience in the Player

The different open-ended questions indicated that a wide range of features are presented, derived from both positive and negative comments. Even though reading is a rather personal experience, implementing enough features where users can personalise and adjust the app to their preferred reading experience, would lead to more satisfaction in using the application for the majority of users.

Additional content (links, images, and videos)

The additional content plays an important role in the overall immersive experience, supported by the 3D-audio. The open-ended questions highlight room for improvement, both for the execution and the presentation of the additional content. In addition to this, a broad overlap with other themes is observed, presented in different sections of this report (Table 15).

Umbrella tags	Feedback
Buttons, links, and redirection	The links/buttons in the text need to be clearer to the user
	Better switching between the story (text) and the additional content -or the additional content should be integrated in-text, so therefore, the story won't be interrupted
	Add a preview/pop-up window for the additional content, so you know what sort of content you will see before you are redirected
	Decide in the settings what sort of links will be available/seen in text (e.g., you can decide not to see the links redirecting to videos)
Content	The videos can pull the user out of the story (this isn't a feature)
	Some don't find the additional content immersive, or contributing to an immersive experience
	Some desire more additional content
	The additional content needs to be of high quality

Table 15. Feedback on additional content in the Player

The big debate is about the links and redirection of the additional content, which is closely related to the section 'Multimedia and content redirection'. Yet, it plays an important role in how users experience the additional content. Some users do -or would- enjoy the additional content, but don't appreciate the required redirection, that (can) pull users out of the story.

Final remarks
The themes and tables present a general overview of the answers to the open-ended questions. For the results, clear areas for improvement can be observed, with clear examples such as more control over the audio (i.e., audio/volume mixer), or better redirections to the additional content. Due to the early stage in the development of the application, most feedback pertains to the interface (e.g., missing buttons, options, control, etc.) and the present content that is available. Still, the feedback listed in the presented tables, and the other section covering the closed-ended questions, will be a good starting point to improve the Player.

3.4.1.2 Analysis of closed-ended questions

From the closed questions, the following outcomes were generated.

Aspects regarding signing into the app scored quite well. Respondents found that creating an account was a very easy task (4,4/5). Also, choosing relevant topics was easy (4,1/5). Finally, respondents found it helpful to set up their own profile (3,9/5).

Respondents were also positive about aspects related to the appearance of the app. They found that the covers of the books looked attractive (3,9/5). The categories were also found to be clear (3,9/5). Lastly, respondents found it easy to open a book (4,2/5).

Regarding the reading experience, there are a couple of issues that are worth mentioning here. Firstly, regarding the reading itself, overall, respondents found it easy to read a section of the (4,0/5) and found the text easy to read (3,9/5). Secondly, respondents were neutral about audio clarity (3,2/5) and immersion through the audio tracks (finding the sound made them feel like being in the book scored 3,3/5). Lastly, they found it easy to control the sound (3,6/5). The scores on links to additional media content were close to each other, however based on our range values there were slight differences. Respondents found that the links to additional information in the story (3,5/5) and the illustrations in the text (3,5/5) could contribute to an enjoyable reading experience. They also found it easy to access the added content (3,8/5). However, they were neutral about finding the links to additional videos in the story (3,3/5), the links to collections (images and information) and the combination of audio and text (3,0/5) contribute to an enjoyable reading experience. They were also not satisfied with the ease to pick up the story again after closing the added content (3,4/5).

Respondents generally had a good experience with the app. They gave a good score on the rating of the app (3,5/5).

Table 16 presents the assessment for the closed questions of the Möbius Player:

Umbrella tags	Feedback
Signing into the app	• Creating an account went very easily (4,4/5) • Easy to choose relevant topics (4,1/5) • Helpful to set up their own profile (3,9/5)
Appearance of the app	• The covers of the books look attractive (3,9/5) • The categories (recent, popular, and recommended) are clear (3,9/5) • Easy to open a book (4,2/5)
Reading experience	• Easy to read a section of the chapter (4,0/5) • The text is easy to read (3,9/5) • Neutral about finding the audio clear (3,2/5) • Neutral about finding the sound make them feel like being in the book (3,3/5) • Easy to control the sound (3,6/5) • The links to additional information in the story contribute to an enjoyable reading experience (3,5/5) • Neutral about finding the links to additional videos in the story contribute to an enjoyable reading experience (3,3/5) • The illustrations in the text contribute to a pleasant reading experience (3,5/5) • Neutral about finding the links to collections (images and information) contribute to a fine reading experience (3,4/5) • Easy to access the added content (3,8/5) • Neutral about finding it easy to pick up the story again after closing the added content (3,4/5) • Neutral about being satisfied with the combination of audio and text as a reading experience (3,0/5)
Rating of the app	• Rating of the application is good (3,5/5)

Table 16. Assessment for the closed questions of the Möbius Player

3.4.2 Impact assessment

Social impact: Impact on behavioural change

Impact on behavioural change considers transformations promoted as an effect of the introduction of a new technology into a social context. Changes on daily routines, habits, sociality, etc. are some examples of this type of social change mediated by technology. In the case of Möbius Player, impact on behavioural change consists in a set of activities and habits regarding the reading experience. In this Pilot Phase the following indicators have been analysed:

- Accessibility to older adults, people with disabilities
- Change in reading habits

As mentioned above, for structural reasons due to the ongoing phase of the project, it is not possible to evaluate how and where the Möbius Player could impact the behaviours of end-users. In the analysis the indicators of “Accessibility to older adults and to people with

disabilities", "Change in reading habits" and "Increase in book consumption" will be used as insights for the forthcoming investigation in PP3.

Regarding the access by older adults, the generational gap argument is very common among the respondents. It is used in order to justify and defend the reading habits and traditional book reading experience: Möbius player is considered "for young people, this is their world". This argument tends to exclude (or self-exclude) the elders as a potential target and emphasises a potential increase in book consumption in "small children in the family": "People are different, maybe someone would love the idea more than me. I think that the younger generation, used to receiving many stimuli at once, would have a better chance of success".

Regarding the accessibility to people with disabilities, a positive impact has been expected to the mitigation of ADHD, Dyslexia, and the inclusion of blind people in the reading experience through audiobooks. On the contrary, due to the light of the screen, "people with vision problems would be better off reading a [traditional] book". The light adjustment feature, as emerged in PP1, can have a potential role in the inclusion of this social group as end-users.

Beyond the generational gap, it is noteworthy that most of the participants have declared to read digital books and listen to audiobooks "never and very rarely" (respectively 59,16% and 60,31%). Traditional reading habits can condition the perception and attitude towards innovation, consolidating a mental closure based on individual experience and taste ("It is not attractive, and I would not want to recommend something that I would not use myself").

Besides personal and subjective arguments, it is not easy to assess the "increase in book consumption", but some directions can be depicted, looking at the advantages and disadvantages of the tool. The advantages combine emotional and instrumental sides.

On the emotional side, the reading experience with the Möbius Player is "more attractive than ordinary books", expanding it with additional media (e.g. photos, audio, videos, and links) giving a "more in-depth experience". Audio is important for the "atmosphere creating", it gives the reader an "extra experience with music and reading aloud" and it can also have a positive effect on the engagement and increase in book consumption: "the sound invites you to read on".

The instrumental side of advantages is essentially based on multitasking features: "you don't have to bother with finding music yourself during reading", "need not pay attention, can listen", "not disturbing others reading through headphones", the easiness of "accessing to books", the possibility of "learning languages" while reading, and the possibility to enlarge the experience with more data, media content and information. This element is discussed in relation to students: "an interesting form where additional information can diversify and interest, for example, reading material. It's hard to find a recipient of such an application in my group".

Disadvantages have been related to the current stage of the toolkit, such as technical affordances, but also to some basic characteristics of the Möbius Player, such as the extra content ("distracting", "disturbing", "not needed"), and to digital devices for reading. Although external to the impact assessment of the toolkit, a recurrent theme is expressed: digital and

multimedia reading could have a negative impact on the reading experience as a loss of imagination and fantasy: “If I am interested in illustrations, I will buy the paper version. I use audiobooks very rarely; I don't like this form of contact with literature”. Reading, although considered a pleasant activity, it “takes a lot of effort, listening less”.

“Let people use their own imagination” and “let your fantasy do the work” are just two appeals to look at the ambivalence of this innovation, which on one hand could promote reading in marginalised or disinterested social groups, but on the other the affordances implemented in the Möbius Player are part of the bigger challenge of the digitization of human life. It should be emphasised though that these tools are considered as complementary to traditional reading and do not aim to replace this activity.

In conclusion, there is no common attitude towards the potential changes in reading habits, but rather “mixed feelings”. Again, on one hand, there are some who are enthusiastic and manifest their enjoyment for the ease of use and the possibility to personalise the account, but also some who are concerned about the impact: “it takes out the creative side from reading. Likes audiobooks though. Need to preserve creative spaces”.

Technological impact: Impact on the use of technology
Similarly to the Möbius Creator, for the assessment of the technological impact of the Möbius Player, the impact on the use of technology is a dimension related to the transformations on end-users’ behaviours and awareness in relation to technological devices and resources. In the assessment of the Möbius Player, the following indicators have been analysed:

- Rate of satisfaction of people experiencing the Möbius book
- Usability: easy to use, easy to learn
- Increased understanding of the story through immersive audio

The first indicator of satisfaction consists of a general evaluation (i.e. “rate the application”): the mean value is 3,5/5. Here, 59,82% of the participants responded positively, 28,24% neutral and only 11,83% negatively. Going more deeply into the evaluation of the reading experience, the presence of some features (such as links to additional information, links to additional videos, links to collections, and illustrations in the texts) are considered positively with mean values around 3,4/5. Illustrations in the text are the more accepted feature contributing to a pleasant reading experience (60,31% positive), while the links to additional videos in the story are unaccepted for almost a quarter of the sample (23,19% negative).

Usability as the ease to use and learn the application has been explored in several tasks and activities which characterise the reading experience. The easiest activities are “creating an account” (92,8%) and “opening a book” (90,7%), while “choosing relevant topics” and “reading a section of the chapter” has a slightly lower degree of easiness (respectively 84,35% and 83,65%). Although with significant positive responses (>70%), some difficulties have been found in the text reading and the access to the added content: 8,43% disagree and strongly disagree with the item “the text is easy to read”, and 10,69% disagree and strongly disagree to the item “it was easy to access the added content”. The most critical activity regards the

item to resume the story after closing the additional content: only 53,26% responded positively, 30,27% were neutral and 16,48% disagree and strongly disagree. Apart from these specific and minor criticalities, the usability has been positively evaluated in terms of easiness.

A third indicator of immersive audio has been considered separately. The “Increased understanding of the story through immersive audio” has been investigated directly with the following item: “The sound makes me feel like I’m in the book”. The feeling of being “in the book” is shared by 48,47%, while 25,57% is neutral and 25,95% responded negatively. A similar distribution in the question of the satisfaction rate on the “combination of audio and text as a reading experience” (respectively 51,91% positive, 25,96% neutral and 22,13% negative).

In these two cases, it seems that the value of the immersive reading experience does not fully depend on the immersive audio, but on other features such as texts and images. It is possible to assume that this is due to the low degree of cross media experience in the participants: only 26,72% read digital books and 27,48% listen to audiobooks.

3.5 Möbius Prosumer Intelligence Toolkit: results of evaluation and assessment

This section presents the results of the user evaluation and impact assessment of the PIT. These are based on 32 individual think-aloud sessions and interviews. The general evaluation analyses the participants’ user experience with the app (Subsection 3.5.1). The impact assessment of the tool (Subsection 3.5.2) elaborates the social and technological impacts observed.

3.5.1 General evaluation of tool

At this point in the project, the application of the PIT has progressed to a stage where a clickable mock-up devoid of integrated data was developed. The mock-up served as a visual representation of the envisioned product, allowing users to navigate through its various features and pages. Participants were asked to explore this mock-up thoroughly and provide insights into their expectations regarding the data and insights they anticipated finding within the application. The method mainly consisted of asking participants' interpretation of certain aspects from the PIT, without telling them what those aspects really meant beforehand. Additionally, feedback was sought on their overall experience while using the tool, including usability issues they encountered or features they found particularly engaging. To facilitate a clear analysis, our discussion was structured around different pages and features of the mock-up, supported by screenshots of the PIT.

Dashboard (home page), (Figure 4)

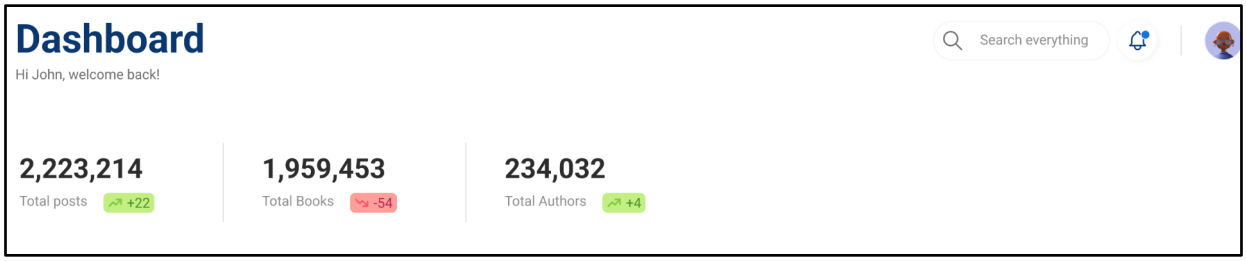

Figure 4. Statistics of dashboard

During the interview, the publishers were asked how they interpret the different numbers of 'Total posts', 'Total Books', and 'Total Authors'. Some publishers didn't really go too deep into the meaning of the numbers, whereas others gave more in-depth feedback about the different numbers. Some users understood the green and red boxes displaying the up- and downtrends, but still confusion arose regarding the source of the data as users asked where the data was collected from.

Total Posts: Total Posts refers to the number of comments in the dataset. However, when respondents were asked how they interpreted this (without prior knowledge), the metric caused some confusion, due to the strong link of 'posts' to social media channels such as Facebook and Instagram, where participants linked the metric to posts derived from social platforms about the books and/or authors. Second, posts were linked to content (i.e., comments) users posted online about books and/or authors. Third, some users interpreted the posts as all the posts that are posted on the platform. Fourth, the posts refer to the number of posts connected to authors and/or book titles. Lastly, the posts refer to the total number of posts on different websites about books. Thus, it is clear that 'Total posts' lead to different connotations, and questions. Therefore, preparing for PP3, more indicators or a tutorial integrated in the dashboard should be prepared which explains the data collection, aggregation, and presentation.

Total Books: Total Books refers to the number of books in the dataset. Nonetheless, when respondents were asked how they interpreted this (without previous knowledge), the answers also showed confusion, due to some participants not fully grasping how and where the data was collected. First, the link was thought to show the total number of books published, but this is rather vague, and not reasonable. Second, the metric was considered to refer to the total number of books registered in the system (referring to the app). Third, participants expected 'total books' to refer to the total number of books referring to one subject. Fourth, the link was made to the 'Total Posts', where the number of books refers to the posts referring to the books. Fifth, participants expected it to present the number of books published in one month. Lastly, the link was thought to represent the total number of books written by the authors ('Total Authors'). Again, different interpretations were witnessed, which could be avoided if more clarification regarding the data input is mentioned in the dashboard itself.

Total Authors: Total Authors referred to the number of different authors in the dataset. Here respondents also showed confusion on how to interpret this (without previous knowledge).

First, the authors were linked to the number (‘Total Books’) on the platform, and therefore, the number of authors who wrote the book. Second, it was thought that authors referred to the number of authors on the application. Third, the total number of authors was thought to refer to the authors talking about the books, yet it is not mentioned where these conversations take place. Lastly, the ‘Total Authors’ was linked to the ‘Total Posts’, stating that the number of authors is linked to how frequent the authors are mentioned in posts. Therefore, the same conclusion was reached, i.e., on how there is a need for more clarification about the meaning of the data in the dashboard.

Post statistics (Figure 5)

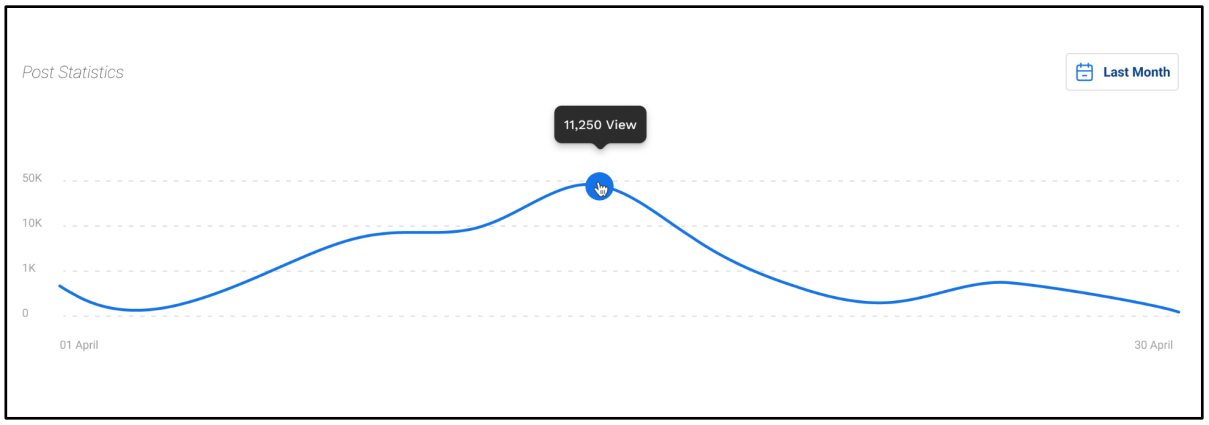

Figure 5. Post statistics chart

The 'post statistics' chart referred to a visualisation of the timeline of comments over time. This chart did also lead to different interpretations. It is estimated that the answers of the participants are influenced on how they think/understand the data is collected (where and how). First, some users didn’t understand what the chart represents, and with clarification they didn’t have an opinion about the chart. Second, the majority of users discussed the chart and how it presents a monthly view, but their opinions differed regarding what the chart actually represents. Some see the graph as the number of views, views per post, number of posts from the readers, the number of reviews, how often books are mentioned on social media, etc. Thus, the interpretation of the chart leads to different things that could be presented. Again, the need is to integrate the necessary information, so users understand what the chart represents. Also, another important point was raised, i.e. the ability to zoom in and to see a more accurate presentation of the data.

Popular books (+ icons), (Figure 6)

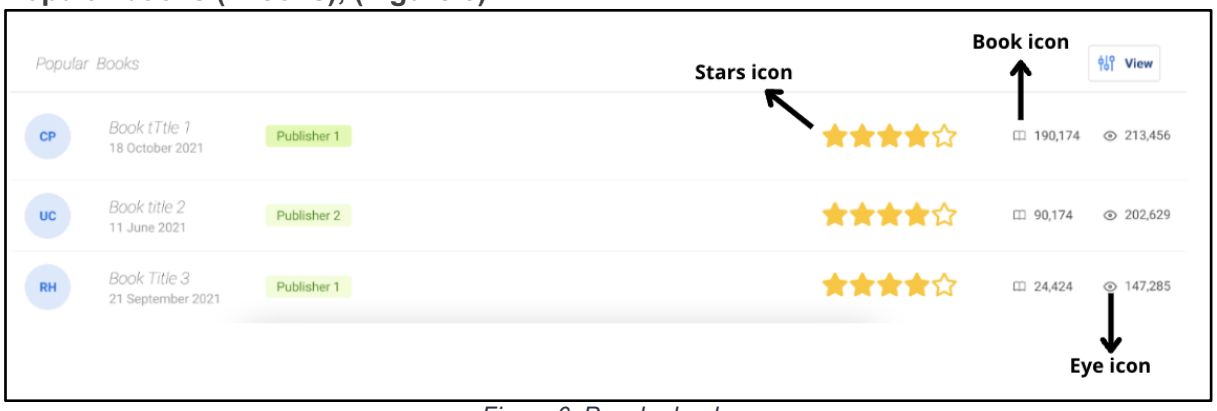

Figure 6. Popular books

Participants in the individual think aloud session were asked to explain how they interpret the different icons displayed (without prior knowledge). The **book icon and number** next to it indicated the number of comments it received, the **eye icon and number** indicated the number of views the book had and finally the **stars** referred to the average rating a book received.

The input of the participants is presented in the following paragraphs.

Book icon: the most obvious interpretation of the icon, is the number of people that read the book. Second, the link was made on how often people interacted with a book. Third, the icon was thought to present how many times the book has been downloaded (this can also be seen as an interaction). Fourth, the link was made with the number of sales the book enjoyed. Fifth, an interesting insight, the icon was considered to refer to the number of posts, reviews, or articles (online) written about the book.

Eye icon: the obvious interpretation was the number of views per book, followed by the number of clicks on the book. Second, a different interpretation was that the icon would represent the number of people that rated the book. Third, the number of people that viewed the book on the website but didn't read the book. Fourth, how often the posts about that certain book have been viewed online by the readers. Fifth, the number of readers that viewed/read the preview of the book.

Stars icon: the obvious interpretation was the rating of the book given by the readers on the platform. Second, the stars could also refer to the level of popularity/trendiness where for example four stars resemble trending. Yet, one crucial piece of feedback is that there isn't an indicator (number) of how many people rated the book. Therefore, the usefulness as an indicator was questioned. Also, the participants indicate that they need to know where these ratings are coming from.

Overall, the 'Popular Books' section does raise numerous questions. The section doesn't define where the results were collected, and how the different icons and numbers should be interpreted. Therefore, a hover-over function with additional information could be an ideal

feature to clarify the section. Also, the section could be used to perform competitive analysis between different books, from different publishers.

Authors tab, Books tab and Posts tab

Authors tab, Books tab and Posts tab were similar. All these tabs contained a keyword graph, a post pie chart, and a timeline. The visuals with numbers were therefore identically the same. The keywords graph was an interactive radial graph that displayed the most important keywords from the dataset (the size of the slice is the number of times the keyword was used). The post pie chart was an interactive pie chart showing the most commented books in the dataset (the size of the slice is the number of comments on the book). The timeline showed an evolution of authors, books, and posts in the dataset by week, month, and year.

Authors tab

This tab contained a keywords graph, a post pie chart, and a timeline (Figure 7).

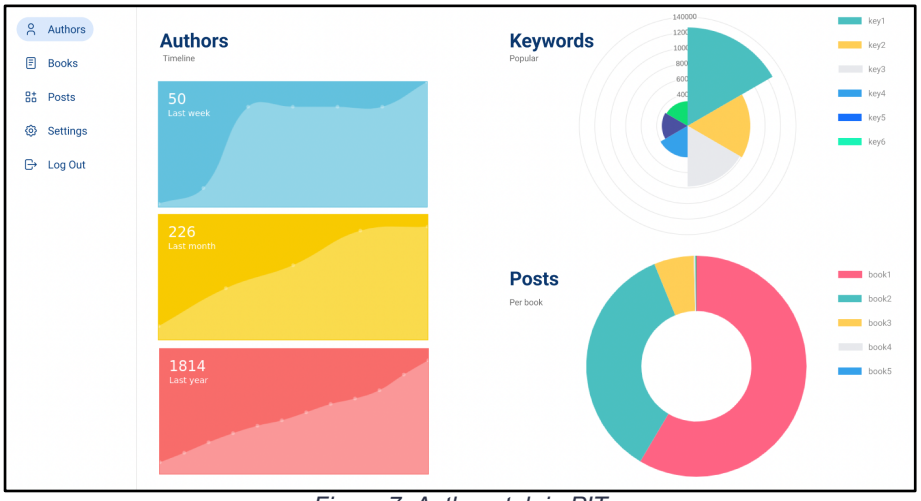

Figure 7. Authors tab in PIT

Keywords graph

When presenting the keywords-graph, real keywords were used, which made it more complicated to convey the use and value of the data. However, the majority of users assumed that the given keywords were related to authors. Some users made the connection with posts, where the keywords are derived from posts, and linked to the authors. Others suggested that the given keywords are frequently used to refer to certain authors, yet some mentioned that the context, where these words were used -or gathered from, isn't clear.

Besides the discussion on how they interpret the pie chart, some participants mentioned how these keywords could be useful. The keywords about authors could be useful to spot future trends, based on how often certain authors are mentioned or displayed by the keywords. Also, certain features were mentioned that could improve the chart, for example, the option to lookup specific authors, or filter by certain genres and user demographics.

Post pie chart
The pie chart led to different interpretations, due to a lack of information in the dashboard. For some participants it was clear that the graph presented the number of posts per book, but they mentioned how it didn't specify which books are mentioned, who wrote the book, if the books are from different authors, the number of posts on social media, etc. Yet, others had more trouble understanding the meaning of the chart and what it represents. Therefore, it is concluded that it wasn't clear to the participants what data is presented, and how it can be of use for publishers.

Timeline
Just as the other charts, additional information was required for the participants to give opinion/feedback on the timeline. The most common interpretation was that the timeline presents the increase in authors on the platform over time. Others mentioned that the timeline would logically present the number of posts published by the authors on the platform. Thirdly, someone stated that in their opinion, the timeline represents the number of mentions of a certain author(s) on social media. In addition, the link with keywords was made, when someone gave the indication that the timeline could refer to the number of mentions of authors, based on the keywords.

Still, there was some confusion about what the timeline represents and what data is used:

> *"Not really sure if authors are people who write books of fan fiction."* (Quote by participant in think aloud session).

It was also mentioned how the chart would be more interesting if it was possible to see dates as well (or some sort of search per data function).

> *"Maybe add the days to the graph, even that wouldn't look that nice. Also, the weeks aren't clear, which of the weeks does it present? Lastly, which months are presented?"* (Quote by participant in think aloud session).

Conclusion
There was some confusion about the different graphs, how/where the data was collected, and on what data the graphs are based on. Furthermore, the graphs do have certain gaps regarding the keywords that weren't real keywords, the X/Y axis in the timeline doesn't have clarification, etc. Hereby, the participants didn't fully understand the purpose of the Authors tab.

Books tab
The Books tab (Figure 8) is identical to the Authors- and Posts tab, meaning that the layout and graphs are the same. This led to confusion, and therefore, the participants needed extra information on how each page presents similar graphs, but the data will be focused on different subjects (i.e., for the Books tab it is focussed on books). Due to the identical graphs and layout, the feedback was mostly similar to the Authors tab (because the Authors tab was the first of the three tabs discussed).

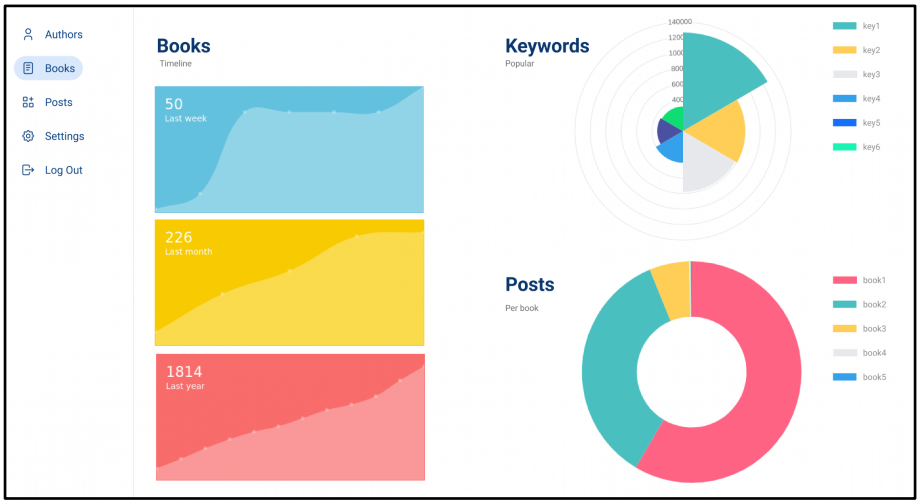

Figure 8. Books tab in PIT

Keywords graph

First, the majority linked the chart to the most used keywords related to books but didn't specify which books (single title or multiple titles). Some mentioned how these keywords could refer to keywords that readers use to search for books. An interesting perspective discussed how the keywords could be created by the publishers (of the book titles) and how they perform online. Lastly, the link was made between the keywords and how they can relate to genres, meaning that it can be useful to see what topics/genres are gaining more traction online, and therefore, it has potential to support decision-making processes for publishers.

Post pie chart

The pie chart again led to different interpretations, due to the lack of background information about the data and data collection. In Table 17 below, the different interpretations are presented.

Number	Interpretations
1	The chart presents the percentage/number of posts per book
2	The chart presents the remark/ratings towards the books
3	The chart presents the number of posts per book on social media
4	The chart presents the post per book, derived from the website where the data is collected (i.e., fan fiction website)
5	The chart presents the posts per publisher or author about the books
6	The chart presents the number of posts per genre (i.e., horror, fantasy ,etc.)
7	The chart presents the most quoted books (online)

Table 17. Interpretations of post pie chart in Books tab

Besides interpretations, suggestions and feedback were given by the participants. (i) It's interesting to see the six most popular books, but a wider list of lower ranking books would be a good addition to the tool. Similar to the first six keywords, which are probably obvious for the

publishers. Publishers are interested in the more (lower ranking) hidden keywords and books that readers are looking for. (ii) A graph dedicated to the books of the publisher would be helpful to track their catalogue. (iii) A functionality/graph that can present track the genres instead of popular books (more niche filtering). (iv) A timeline, presenting the data and when it is collected.

Timeline

Similar feedback was given as the timeline of the authors tab. However, a brief overview is presented in Table 18. Overall, it wasn't exactly clear what the timeline resembles because of the large numbers.

Number	Interpretations
1	The number of mentions about a book (over time)
2	The number of interactions with a book (over time)
3	The number of published books (over time)
4	The number of most popular books (over time)
5	The number of new books on the platform (over time)
6	The number of edited book (over time)
7	The number of quotes about the book (over time)

Table 18. Interpretations of timeline in Books tab

Conclusion

A similar conclusion can be reached regarding the Authors tab, where more clarification and basic features are necessary.

Posts tab

The Post tab (Figure 9) shares the same graphs and layout as the Author- and Book tab, but when the data would be integrated, the visuals on this tab would represent keywords, posts and timeline related to the posts analysed from AO3.

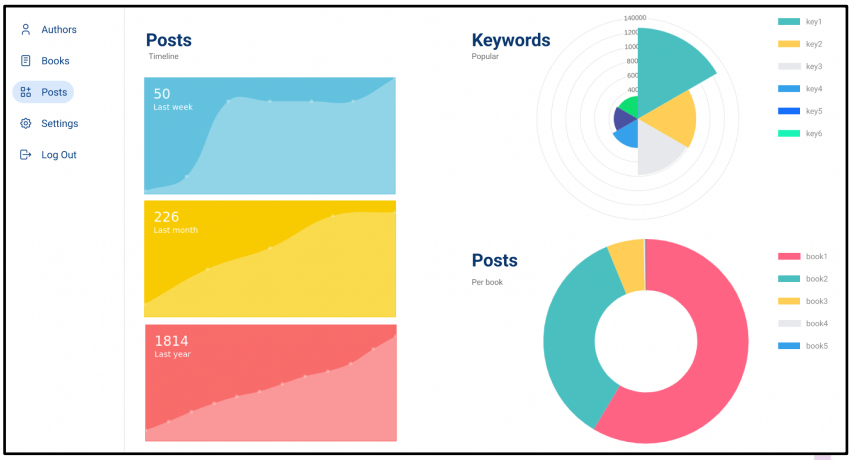

Figure 9. Posts tab in PIT

Keywords graph
Most participants linked the chart to the most frequently used keywords in posts. Some linked the keywords to genres or themes of particular books. For others, the keywords reminded them of social media, such as hashtags.

Post pie chart
The chart wasn't really clear. Most respondents thought it was about books. They linked it to the number of posts per book. Some thought it was about the most popular keywords in posts. One respondent thought it was about which books are most popular online, another thought it was about the most popular post. So there turned out to be a lot of confusion. There was also confusion about the design. Respondents mentioned that the similarity of colours could lead to confusion.

Timeline
Most respondents interpreted the timeline as the number of posts per week, per month or per year. One respondent thought the timeline represented how often a publishing house is mentioned on social media. Someone wondered where the posts came from. According to this respondent it would be interesting to choose the country or language in which the posts were made. Another respondent would find it helpful if it would be possible to choose a keyword and see the specific timeline for this keyword. Also here came the remark of a respondent that the colours do not differ enough from each other.

Overall feedback

In this section, an overview of all the feedback related to the PIT is provided, encompassing various aspects of its functionality and usability. Participant responses regarding the PIT's potential integration into decision-making processes are presented, highlighting optimism about its ability to open new data streams and its user-friendly visualisation features. Additionally, critiques concerning missing features and technical clarity are addressed.

The publishers were asked if they would be interested in using the PIT and integrate the application in their decision process. It was observed that the majority of the participants were optimistic and interested in the application. First, the PIT opens new streams of data (based on fanfiction), hereby, presenting new insights regarding what's happening online. Second, the easy visualisation of the data (even though it's a mock-up) made the PIT appealing, due to its rather low threshold (due to the easy graphs) the dashboard can be used by employees without any analytical background. Third, overall, the application is simple and inviting to use, which is a good sign. Still, not only positive feedback was given; in fact, plenty of feedback regarding missing features and unclear technicalities of the dashboard was received. These are summarised in Table 19 below.

Umbrella tags	Feedback
Keywords	Users are interested in the long tail of keywords related to authors, books, and posts

	The graph of the keywords doesn't say much. More indicators, what the graphs and metrics mean, would be beneficial.
	Search bar function, to search for specific keywords
	Timeline graph for keywords, where you can track specific keywords
Guidance	Needs for additional information about the application
	Include a tutorial for the application
	Include more languages
Data and graphs	The need to see where the data is coming from (which platform)
	Include an impact graph
	Expanding (clickable) graphs to see more in-depth insights about the data
	Filter function (in-graphs) to filter a graph based on certain criteria (i.e., authors, genres, posts, etc.)
	Comparison feature, meaning you can compare different sets/inputs of data (i.e., compare two books, posts, authors, etc.) so can see the difference in number of books, posts, interactions, etc. (compare feature over time, how is the title doing the last few years/months)
	Include a search function (i.e., search bar) so users can search in the graphs/data (similar to a filter), e.g., search for certain keywords and see how they rank
	'Focus' feature where users can follow/track a certain book, authors, post, etc. and see how it performs over time
	More insights about the reviews (star icons)
Layout	The graphs/visuals should have more colours
Technical	Export function, to be able to export data (Excel, SPSS, etc.)

Table 19. Overall feedback of PIT

3.5.2 Impact assessment

Social impact: Impact on knowledge production

The dimension of impact on knowledge production refers to changes in the creation of information and knowledge and their circulation across the world, especially where digital devices can accelerate innovation processes. For the assessment of the PIT, the analysis was focused on the following indicators:

- Potential increase in knowledge on user behaviour and market trends
- Potential increase in understanding of readers

Publishers interviewed have declared not only their interest in but also the value of the knowledge of the readers' reading habits obtained through the PIT. Indicative is the following quotes from a participant to the interviews: *"The application could give me some perspective about what people say about our books."* This kind of feedback is also related to business strategies, as publishers could potentially translate the posts as marketing media. Indeed,

some opinions, shown through the quotes below, make explicit the economic potential of two features of the PIT:

- timeline: *"could be interesting to predict the future about what readers like"*.
- most used keywords: *"very useful for a publisher to know where to focus on for marketing"*, *"to know what users are looking for"*.

PIT is also perceived as a bridge between publishers and readers, insofar as "this can help publishers understand why certain books are more popular than others", "to know which keywords are popular in different parts of society", and "to know how specific titles in specific markets are compared to others". Prosumers' knowledge entering into the publishing knowledge management can reduce the distance between them and the audience, and knowing readers' taste can also be an opportunity for the publishers to launch new trends. "There are not many people that post content about our books, so I don't know if it would be effective to give me an idea of what people think about our books." But for some specific segments: e.g., fantasy books this could be useful. Although the majority expressed a positive feedback, in some cases the potential increase in knowledge on user behaviour and market trends is denied ("it's not necessarily what we're looking for in the German market") or suggested for other stakeholders: "Maybe it's not my area as an editor but it would be interesting for my boss", "Might be useful for bigger publishers but not sure if it's useful for smaller publishers". From the impact assessment point of view, in a qualitative sense, the interest in knowledge production aims at the prediction or the launch of new trends based on the readers' habits and tastes.

Technological impact: Impact on the use of technology and on data usage

In the assessment of the technological impact regarding the PIT, during PP2 two key dimensions were analysed. Firstly, the impact on the use of technology is examined through the following indicators:

- Rate of satisfaction in using the toolkit (general + per feature)
- Assessing user friendliness

The second dimension focuses on the impact on data usage. Data lies at the core of the PIT, serving as the foundation for collected and processed information as well as visualisation tools. For this reason, this dimension was analysed using a specific satisfaction indicator for data output:

- Quality of data output

In the assessment of satisfaction and friendliness of the PIT during PP2, different positions emerged but with a substantial positive evaluation: 56.25% respondents have declared the PIT is "easy to use", "nice to use", "clear to understand" an in many cases "useful" and "would use it": "We really like this kind of information"; 15,63% respondents appreciated it, but adding some personal comments on specific features and tools, especially about "tutorial or guidelines", or "instructions to analyse what we are seeing[3]. Like a first tour, through the

[3] The remaining 28.13% of the sample did not express an opinion about it.

application", “search-bars and filters”. In one case it has been stated a personal interest not related to the work, due to the genre they deal with (non-fiction); on the contrary in another case, the respondent sees the value of the PIT for her company: “Maybe it's not my area as an editor but it would be interesting for my boss”.

Regarding the assessment of the quality of data output, many comments have been collected on data quality that express two main positions. On one hand, there are many comments which express difficulties of interpretation and visualisation: "This side of the data is difficult for me to interpret these charts". In particular, some respondents find it difficult and hard to deal with Book and Author tabs. On the other hand, some asked for additional data, e.g., “to know where the posts are from and if they're positive or negative", or for “a filter to add or exclude data would help to understand the app better”. In other words, data quality is strongly related to the visualisation issue at the current stage of development: “I would need more examples; for example, I want to see real data on the charts. And then I can tell you more because when we see the same data in every tab it is difficult to interpret this data."

3.6 Final remarks

3.6.1 Final remarks on general user evaluation

For the Creator, it was noticeable during PP2 that users were mostly neutral about their experience with the app and in particular about the user-friendliness of the app, creating a book, creating a chapter, integrating text files, integrating call to actions, uploading, and sharing content. They were, however, positive towards integrating images, audio files and 3D audio elements. Participants mainly felt that the app lacks intuitiveness; for instance, many functions are still missing (such as text-to-speech audio narration), and the app has a poor layout.

Looking at the results for the Player, it is concluded that users found it easy to sign into the app. The appearance was also found to be good, although the layout and personalisation options need to be improved. The reading experience was given neutral ratings. Users indicated that they were not really immersed in the story. A major reason for this was the redirection out of the story after clicking on immersive links. A final notable feedback point was that the audio should be improved mainly focusing on control and available content.

For the PIT, it was observed that publishers are interested in using the PIT. However, there is some confusion about the different charts presented in the PIT, i.e., how/where the data had been collected and on what data the charts were based.

3.6.2 Final remarks on the impact assessment

Social impact

Impact on education

The Creator toolkit does not seem to significantly affect the improvement of digital skills and writing skills. However, the positive value assigned to writing skills is higher than to digital skills.

From this it is possible to suggest that the Möbius Creator may have a more remarkable effect on the development of writing skills than on the development of the use of devices and software.

Impact on behavioural change
In the evaluation of the Player toolkit, a generational gap was detected regarding the approach to the device. The difficulties encountered by the elder end-users in the first approach to the prototype and their reaction ("[it's] for young people, this is their world"), may contain a potential risk of increasing the digital divide between young people and adults. This is expressed in the appeals "let people use their own imagination" and "let your fantasy do the work" against the cross-media overload. Nevertheless, emotional, and instrumental attitudes toward the Player toolkit can be considered not in absolute terms, but as "mixed feelings". Möbius Player is expected to increase this ambiguity, and it is worth investigating it directly.

Impact on knowledge production
In the testing of the PIT the possibility to collect information directly by the prosumers has been seen positively by the publishers in terms of potential prediction of future trends based on the actual readers' habits and taste. The interest in data sources and visualisation tools is high, although many difficulties have been raised.

Economic impact

Impact on cost reduction
In the analysis of the Creator toolkit a different expectation about savings emerged: the toolkit may be promising more in monetary savings rather than in time reduction. This perception probably depends on the difficulties experienced by the participants during the testing. However, it would be interesting to explore this issue qualitatively in the next phase.

Technological Impact

Impact on the use of technology
At this time, it is possible to consider the three outputs together in the end-users' evaluation of general satisfaction (see Table 20).

Output	Positive	Neutral	Negative
Creator	50%	11,67%	33,33%
Player	59,82%	28,24%	11,83%
PIT	56,25%	15,63%	[ND]

Table 20. Satisfaction of the Möbius outputs

The most appreciated toolkit is the Player, whose usability is highly positive and judged in terms of "easiness". In particular, the value of the immersive experience does not lie primarily in the immersive audio, but rather in other features such as text and images. Usability of the

Creator is not yet effective, efficient, and fully satisfactory on the part of the end users, while in the case of PIT there are many difficulties of interpretation and visualisation, but also enthusiasm regarding the possibility of adding more additional data.

3.6.3 A comparative view of PP1 and PP2

In the final remarks of the report on PP1 the aim was to identify the most relevant impact assessment areas and dimensions that emerged during the data collection and analysis. Below, a succinct summary of the insights is presented, corroborated by the findings from the PP2 impact analysis.

Social Impact: Impact on social inclusion and Impact on behavioural change
PP1. The place of disabilities and difficulties in reading emerged in the discussion, suggesting the inclusion of this specific social group as a legitimate participant in the co-creation activities. Another side of social inclusion concerns the "learning effect" of languages through audiobooks. Through approaches of gamification and social network, the Möbius project is expected to reduce the knowledge gap and increase engagement in social reading.

PP2. Marginal social groups affected by ADHD or Dyslexia (along with blind people) are expected to benefit from the Möbius outputs. The expectation of increasing engagement is detected in the younger generations, which are supposed to be more confident with digital technology and multitasking. The "learning effect" of foreign languages has emerged in some open-ended questions.

Economic Impact: Impact on cost and time reduction
PP1. Cost and time reduction have been discussed in relation to the audiobook making process, which is onerous for the writer and expensive for the reader. The possibility to bypass the costs of paying professional narrators and, at the same time, engaging the community of readers could also reduce the cost of promotional activities on social media.

PP2. Quite on the contrary, the interface of managing audio content has been criticised in terms of time consumption. The ambivalence around the time and cost opportunity of this feature, together with the dissonant judgement about the "immersive" reading experience, is remarkable, and it will be monitored in the next phases.

Technological impact: Impact on data usage and Impact on the use of technology
PP1. The project was expected to have a positive impact on data collection and sharing practices, which have been interpreted as means to overcome the current distortion characterising the publishing market and to reduce the knowledge gaps between the different experts involved in the field. Regarding the affordances implemented in the outputs, a potential "boomerang" effect caused by a "cross-media overload" has been stressed.

PP2. A relevant part of the Creator output's discussion confirmed this "boomerang" effect. Indeed, Möbius is expected to enrich and deepen the reading experience thanks to added content; but at the same time, some participants claim to pay attention to the risk of "losing imagination and fantasy" caused by digital reading. This ambivalence goes beyond the Möbius

project in itself; it affects the impact of digital transformation on human habits and on inter-generational relations.

3.7 Methodological considerations

3.7.1 Data gathering tools

During PP2, main efforts have been deployed to define tools that could efficiently collect data without overburdening the participants. In particular, an emphasis is placed on creating a unique tool to collect data for both the user evaluation and the impact assessment, avoiding duplication of efforts for participants. Accordingly, collaboration between DEN and IMEC aimed to align all the validation activities.

3.7.2 Analysis

The data analysis involved a combination of qualitative and quantitative methods, in particular thematic analysis and descriptive statistics following the Impact Assessment Framework. In this report only data from PP2 are considered, except in Subsection 3.6.3 where they have been compared with the main results from the PP1. Due to the low amount of data for the Creator and PIT outputs, it was not possible to deepen and strengthen the statistical analysis. Nevertheless, some recurrent and transversal issues, such as the relation between satisfaction and usability, easiness and clearness have been identified and will be reappraised for PP3 data gathering and analysis.

3.8 Next steps

The project's impact assessment intends to be an iterative process, evaluating "a precise moment of technological development but also informing the next stage of technical improvement". This self-reflective tool can "help the project to reflect on the outputs while the project life cycle is accomplished". The general aim of the assessment work across the three phases is to assess Möbius outputs' impacts accurately and shape sustainability and exploitation strategies.

This report, based on the evaluation conducted during PP2, will set the baseline for the evaluation of the PP3. In the design of the upcoming phase, the third round of analysis will commence by verifying the reported dimensions to ascertain their current validity. Secondly, due to the technological improvement of the outputs, particular attention will be directed to previously unexplored dimensions, to see if further elements need to be considered among the most relevant expected impacts. Then, the dimensions from previous rounds will be reassessed to identify any changes or continuities.

In the present report it was noticed that themes such as the "mixed feeling" and the "boomerang effect" characterised perceptions of immersive reading and audio experiences. These aspects will be further explored, both quantitatively and qualitatively along with two other aspects: the increase of writing skills and cross-media consumptions, and time-savings related to the use of the toolkits. Potential intersections and interactions between impact dimensions,

particularly in education, behavioural change, and cost reduction, will be investigated. Future steps aim to assess these transversal effects across outputs at the current stage of technological development, and to elaborate a general outlook in terms of sustainability, exploitation, and communication.

For the overall user evaluation and collection of user requirements, next steps will mainly check whether the areas of improvement that users indicated during testing were effectively improved. The surveys will therefore focus on these points. The user requirements obtained from PP1 were supplemented based on the feedback received during PP2. At the end of PP2, the MoSCoW technique was used to ensure that partners knew which requirements were considered as a priority to be incorporated into the applications. This technique ranks the requirements into four categories: must-have (meaning that from a user or technical perspective, these requirements need to be incorporated before the end of the project), should have (meaning that from a user or technical perspective, these requirements are relevant and might be incorporated if there is still time in the project), could have and won't have (meaning that these requirements will not be feasible to include in the applications during the project timeline). IMEC, FEP, EUT and IN2 have each ranked these requirements according to this method. The user requirements from Pilot Phases 1, 2 and 3 are all combined and can be accessed in this document on the project's SharePoint, or on the respective Subsections on the Creator, Player, and PIT in Chapter 4 of this deliverable.

4. Assessing Möbius Pilot Phase 3

4.1 Data collection and analysis

Data collection for PP3 differed from the previous Pilot Phases, first and foremost because products were tested in a near-to-final version, incorporating the user feedback received from the previous Pilot Phases. Secondly, for the impact assessment, instead of interviews, surveys were used (explained below), which provided for the most part quantitative data. This chapter presents the analysis and results of the data collected. A detailed presentation of the piloting activities is available in D5.3 "Möbius Open Piloting".

At a first stage, DEN and IMEC developed a series of questions, incorporating closed-ended evaluation and impact questions. These were incorporated into Hotjar, to be filled during the testing of the Möbius products. Due to a number of parameters, the application did not work properly (e.g. most often only a section of the questions was answered) and, thus, our approach was modified at the beginning of PP3a to ensure proper collection of data in terms of quantity and quality. Consequently, the data collected through Hotjar will only be used to support data from the other surveys but will not count in the total of responses collected per survey.

In order to find the most efficient way for carrying out the impact assessment activities and the general user evaluation, DEN and IMEC held meetings with living lab partners (ENOLL, and then, later, with Laurea and KPT). As a result, DEN and IMEC developed surveys in Google Forms (in English), which could be filled in on the spot (at fairs and other events) by participants using iPads or other devices brought by the partners (Figure 10).

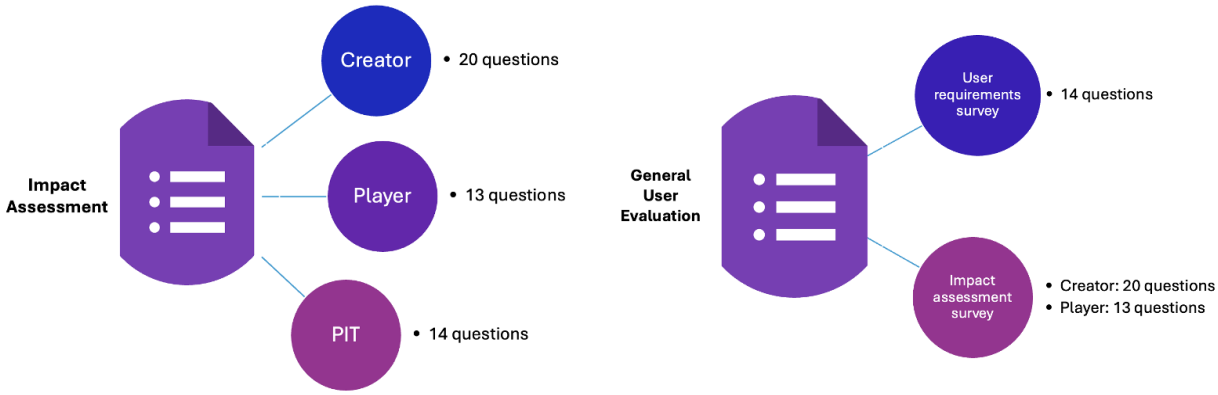

Figure 10. Google survey forms with number of questions per Möbius output

The user requirements survey with more open-ended questions contained 14 questions. Thus, the same questions were asked for the Player, Creator, and PIT, (Annex 1). Regarding the impact assessment surveys, the one for the Möbius Creator (Annex 3) contained 20 questions, while the one developed for the Möbius Player (Annex 4) contained 13 questions. It is important to note that the impact assessment surveys also contained questions that were important for the general user evaluation. DEN and IMEC held additional meetings with the partners to explain the methodology, the reasoning behind it and how forms should be used. The surveys

(Figure 11) required about 5-8 minutes to be filled in. The impact assessment surveys did not collect email addresses or other personal information. However email addresses and other personal information were requested in the user requirements survey, but this was non obligatory for the respondent.

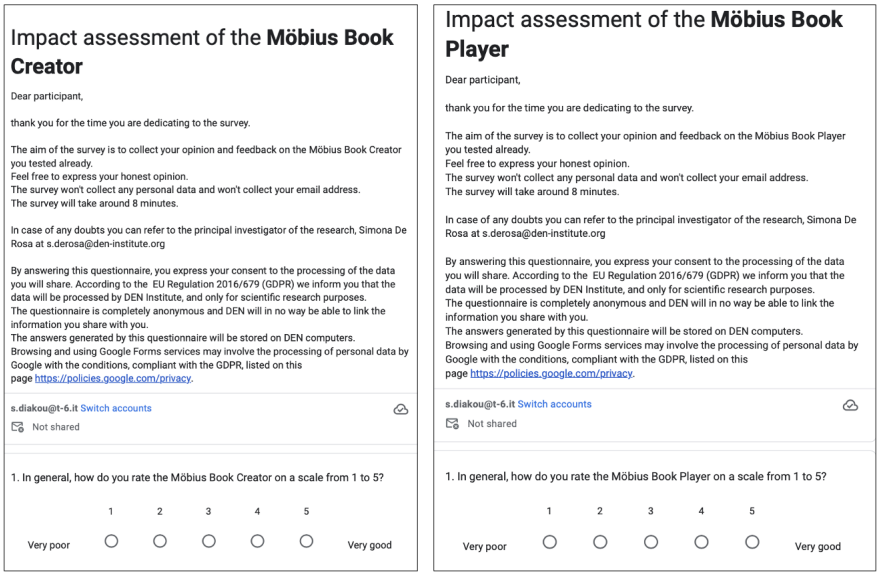

Figure 11. Impact assessment surveys for Möbius Book Creator and Player

Access to the surveys was given to the partners who run the evaluation activities. DEN and IMEC were responsible for making sure that the online forms worked properly. All responses (anonymous) were collected directly by DEN for the impact assessment survey and by IMEC for the user requirements survey. Links to the online surveys were also sent to people who participated in online workshops by the respective partners leading the workshops.

IMEC also organised two online workshops (July 20th and August 7th, 2023) to increase the numbers of participants who would have tested the Creator, using Miro Board, an online whiteboard collaboration tool. The questions from the user requirements survey were therefore used and adapted to create a more interactive workshop.

The impact assessment survey for the Player and the user requirements surveys for the Creator, Player, and PIT were also translated in Italian by ENoLL for the purpose of the Turin Book Fair in Italy. The user requirements surveys were given to participants to fill in during the fair; the responses were translated in English and sent to IMEC. On the other hand, the impact assessment survey was sent to participants of the fair that had provided their emails, and their consent to be contacted with project follow-ups to ENoLL partners onsite. A total of 48 emails were sent by ENoLL; three responses were received.

In addition, the forms (both impact assessment and user requirements) for the Creator and the Player were translated into Polish by KPT and used during piloting activities in Poland. The majority of testing for the impact assessment was carried out during the International Book Fair

in Krakow, held from October 26 to 29, 2023. The raw data (anonymised) from the piloting activities in Poland were shared with DEN. All data from the impact assessment surveys was then merged manually so that it would be possible to conduct a comprehensive qualitative and quantitative analysis. The same approach was done for the data of the user requirements survey, where all data from the translated surveys were forwarded to IMEC for analysis.

Overall, the impact assessment and user requirements surveys for the Möbius Creator and Player were filled in at events in Belgium, Spain, Italy, Finland, Poland, Austria, Germany, Netherlands, the UK, and Slovenia with a total of 111 and 171 surveys respectively for the impact assessment survey (Figure 12) and 111 and 382 for the user requirements survey (Figure 13).

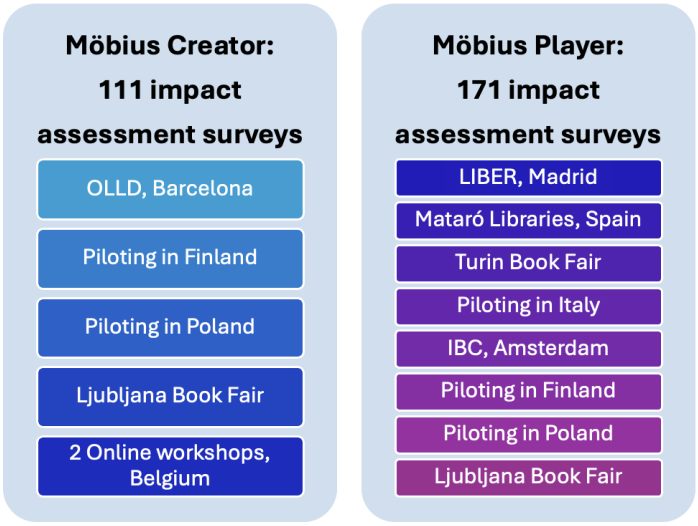

Figure 12. Impact assessment surveys for the Möbius Creator and Player

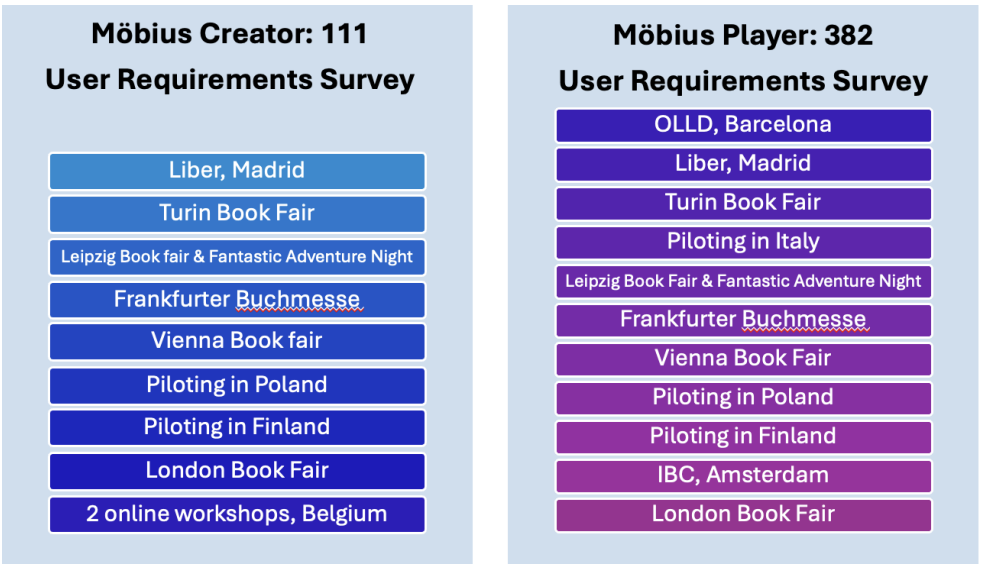

Figure 13. User requirements surveys for the Möbius Creator and Player

Similar questionnaires on Google Forms (with 14 questions for the impact assessment - Annex 5 - and 14 questions for the general evaluation) were also developed by DEN and IMEC respectively, in order to assess the impact of the PIT. As already discussed, the targeted stakeholders for the impact assessment of the PIT were publishers. The initial evaluation and assessment plan foresaw that participants could test the PIT individually and then fill out the surveys, which would have allowed us to recruit more participants. However, due to the need for instructions while using the PIT, this plan was adjusted. Therefore, it was decided to extend the qualitative research efforts as conducting interviews and workshops would allow us to explain and guide participants through the PIT, as they used it for the first time. Despite efforts to engage publishers in the testing of the PIT, either through in-person workshops at events, or online workshops, it was not possible to engage the intended number of individuals (see D5.3 for reference/overview of targeted number of respondents). Looking specifically at the impact assessment of the PIT, despite the fact that the survey was sent to around 500 contacts through LinkedIn, it was not possible to collect an adequate number of responses; in fact, only three surveys were filled in. Therefore, for the assessment of the PIT, the only available relevant data are those collected by IMEC through interviews conducted with publishers (see Subsection 4.4.2).

The in-depth interviews and workshops with publishers aimed to gather feedback and their opinions regarding the use of data from online communities and its potential impact on the publishing sector, as well as on the toolkit in general (Annex 2). Due to low response rate, six in-depth interviews were carried out during the months December 2023 and January 2024, with respondents from Eastern, Northern, and Southern Europe, and one workshop, based on the questions of the user requirements survey, was carried out at the Readmagine in Madrid on June 7th, 2023 (Figure 14).

Figure 14. Piloting activities and testers reached for the Prosumer Intelligence Toolkit

A note on the collection and presentation of data and results: the majority of the impact assessment survey questions asked testers to evaluate aspects of the Möbius outputs selecting values on a Likert scale 1-5 where 1 equals "strongly disagree" and 5 equals

"strongly agree". Results are often portrayed as graphs or pie charts indicating the number of responses and corresponding percentages. These charts were created automatically by Google forms. In order to aid the visual presentation of results, in some cases, results were grouped into "negative" / "no" / "not at all" (1-2), "neutral" / "maybe" (3) and "positive" / "yes" / "very much" (4-5), indicating total percentages.

As a final note, it should be mentioned that the versions of the Möbius outputs that were tested during PP3 and for which feedback was received on their evaluation and assessment were not the final versions. Piloting activities took place until December 2023. Nonetheless, contrary to the original plan to have the final version of outputs ready by August 2023, it was decided to prolong their technical development to November 2023 in order to ensure that the Möbius outputs were in line with user expectations. In fact, additional technical updates took place as late as January 2024 (see D4.5: Möbius Book Final Prototype).

4.2 Möbius Creator: results of evaluation and assessment

This section presents the results of the user evaluation and impact assessment of the Möbius Creator. These are based on the user requirements survey (filled in by 88 people), the impact assessment survey (filled in by 111 people) and 2 workshops (attended by 23 people in total) conducted during PP3. The general evaluation of the tool (Subsection 4.2.1) analyses the participants' user experience with the Creator. The impact assessment of the tool (Subsection 4.2.2) elaborates the social, economic, and technological impacts observed. In the impact assessment survey, participants could indicate via a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) to what extent they agreed with certain statements. In total 111 people filled in the impact assessment survey, which means that the mean value indicated for each aspect is the average of all (111) scores indicated by the participants.

4.2.1 General evaluation of tool

Summary of feedback received via user requirements surveys
From the user requirements surveys, the following key points of feedback relevant to the Creator could be identified.

The idea of creating an immersive story in the Creator using multimedia content is a promising idea for many respondents. In addition, respondents also indicated that it is good to use the Creator as a self-publishing tool, which allows anyone, professional or non-professional, to publish a story online. Nevertheless, many feel that there is still room for improvement. The Creator is considered too complicated by respondents. In fact, respondents mentioned that there are too many steps to create a book. It is therefore difficult, according to respondents, to add content to chapters and to add chapters to a book. As a solution, respondents suggested simplifying the process of creating a book and adding more information (such as a tutorial) in the Creator.

In addition, the UX/UI design was found to be too simplistic. Therefore, respondents suggested improving it and making the UI design more customizable, allowing users to change colours and layout according to their taste. It was also indicated that it can be a threshold to use the app if there is no mobile app available from the Creator. Respondents want to use the Creator

offline. Some respondents raised questions around legal/privacy issues: they wondered how the Creator can ensure that everything that people post is their own work. So, according to the respondents, the Creator certainly has potential, but it needs to be better executed because, according to them, there are other alternatives that are more technically developed.

Table 21 below gives a summary of the feedback on the Creator collected via the user requirements survey.

Questions	Feedback
What is your first impression of the app?	• Copyright concerns • Difficult to use, understand and navigate (too many steps to create book) • Potential, but room for improvement • Need more instructions
What do you like about the app?	• Good idea • Self-publishing

What do you dislike about the app?	• No detailed instructions
	• UX design is too simplistic
	• Too complicated
	  ○ Too many steps to create books
	  ○ Difficult to add content to chapters
	  ○ Difficult to add chapters to books
	• No fan of idea: visuals should be created in readers minds

Do you see potential in this app? Why (not)?	• There are better alternatives • Potential if it is executed better
Do you see some thresholds holding you back from using this app in the future?	• If it stays too difficult to add content (process) • If mobile app is not available • Legal/privacy issues with content

What would you change about the app?	• Make it more user friendly (especially navigation system)
	  ○ Add search bar
	  ○ Simplify steps to create books
	  ○ Make preview more accessible
	  ○ Add tutorial, information on how to use the Creator
	• Develop UI design
	  ○ Make UI more customizable

Table 21. Feedback on Creator via user requirements survey

Summary of feedback received via impact assessment surveys and Hotjar

The feedback obtained through the impact assessment surveys and Hotjar was also used to determine the general user evaluation and also provided additional insights to map the user requirements. The output is discussed in detail in Subsection 4.2.2 to avoid repetition.

Online workshops

Results from the two online workshops (on July 20th and August 7th, 2023) organised by IMEC showed similar insights. During the first workshop, the focus was on first impressions, likes and dislikes, the participants had of the Creator. The second workshop looked, besides impressions, likes and dislikes, also at whether the app had potential and what possible obstacles might prevent individuals from using the tool in the future. All responses were collected via a Miro Board.

Looking at the first impressions of the respondents, many of them found it an interesting app and a good way to create immersive books. Respondents especially liked that, besides text, photos, videos, and audio could be added . This allowed stories to be enhanced. However, what was disliked about the Creator was that the app was not intuitive enough. For example, the layout and styling were rated poorly: common feedback was that a more extensive use of colours should be made in the app design. In addition to this, the process of creating a book was also considered too complicated: the number of steps to make a book should be simplified according to the participants. Respondents indicated that the Creator has potential, but for specific purposes such as presentations or a specific community. Some possible obstacles that could prevent the Creator from being used is that the Creator could not be downloaded in an app store. Also, respondents felt it was important that authors could monetize works through the app.

In Tables 22-23 all the answers that were given in the workshops are presented:

Umbrella tags	Feedback
First impression	• It is quite interactive and gives you confidence as an author to create some stories. It also gives you the commitment to write because at some point you see that some people will be able to read it • Only in English? • Wow! • Never seen before • It seems user friendly • Very cool • Little bit complicated • It seems reliable and works quite fast • Maybe be it would be good to have a short video preview of the process • Looks promising: no coding skills needed; it is creator centred. I like that. • It is really stunning that such useful and easy tool is completely free • Very easy to use: tool can be used easily by everyone • A fast way to work on one's own books; it seems to simplify the process
Likes	• Easy to understand • The preview option • May allow to reach new readers • Easy CMS, works on mobile (although I think one would rarely use a phone to write or add immersive experience to a book • Extending the stories • Thinking of other ways to write • The tool itself could be also handy for people with disabilities, so keep the requirements of the ATAG in mind from the beginning. It will help potential users.

	• Possibility to explore • I really like the fact that you can also add images, audios, and etc. It is good to have this option. • I love the option it has to connect • Simply copying and pasting a code • The collection of the same author
Dislikes	• Not so intuitive for everyone • Not at all intuitive • The post editor should be more sophisticated in terms of layout and styling • I didn't see any good practice example for immersive content • Too many steps for even the simplest actions • I'm not enough digital • It is hard to read some text, so the colour contrast of some text and background elements should be higher • Maybe more colours to get more intuitive • Good for submitting book samples to professionals for readers. I'm not sure if it is good for publishing the whole text. • Description content allows only short segments • I really don't like the fact that one is obliged to copy and paste the text, not being able to directly upload text from a PDF file • I don't like the fact that there are too many steps to add a chapter to a book - even if I also think it is not difficult to follow such process

Table 22. Feedback from online Creator workshop, July 20th, 2023

Umbrella tags	Feedback
First impression	• Interesting app • The app is rather inconvenient to use • It looks like an easy tool to write, with nice features • Good platform to improve the immersive reading • Unsuitable for educational textbooks
Likes	• I like the combination of text and media • Very useful and needed tool • I like it as an instrument to motivate young writers (students) to develop reading skills • It seems a powerful and innovative tool for writers and readers too
Dislikes	• Counterintuitive - on my own, I could not understand the mechanics of the program • I could add pictures, but couldn't find by myself how to add text • Not very easy to navigate without a demo first • Difficult to navigate
Potential vs obstacles	• Is there an app for mobile? • How can publishers monetize their stuff? • What about scientific books? They need footnotes • Good for presentations • Only for community • I am a bit afraid of who is going to check the quality of the created books. Isn't this app somehow removing the editor's job? • Can anyone put their book here, published or not, without any differences? • Not quite sure if the idea is very innovative?

Table 23. Feedback from online Creator workshop, August 7th, 2023

User requirements

Based on the feedback obtained from PP1, PP2 and PP3, user requirements were formulated and adjusted. These were arranged by category. Not all user requirements were integrated into the Creator. Table 24 below presents the user requirements as they were at the end of PP3 (the full table of user requirements, the ranking according to the MoSCoW technique and the comments by partners are accessible in this document):

Category	User requirement
Ease of use	Users should be able to intuitively understand how to use the application
	Users should be able to see where and how to link content in an intuitive manner
	Users should be able to intuitively understand how to use the application
Terminology	Users should be able to see what has been uploaded
	Users should be able to clearly see the types of content and how it is structured / integrated
	Users should be able to create chapters within a book
	Users should be able to see how to publish once they have created a book
	Users should be able to see how to share a chapter or book once it is created
Lack of guidance	Users should be able to intuitively understand how to use the application
	Users should be guided through the application to create their first book
Integrating text files	Users should be able to edit the chapters after uploading in the creator tool
	Users should be able to add long texts to a chapter
	Users should be able to upload text via a PDF file
Integrating audio files	Users should be able to create soundtracks in the tool
	Users should be able to find a directory of free soundtracks in the tool
	Users should be able to find a directory of free soundtracks in the tool
	Users should be able to find a directory of free images in the tool
	Users should be able to integrate the soundtrack itself
Integrating CTA	Users should be able to easily integrate a CTA-link
Integrating images	Users should be able to adjust the size of the media that is added and how it should be displayed
	Users should be able to indicate how the media are supposed to be displayed together

	Users should be able to see the requirements for images uploaded
Additional features	Users need to be able to manage the documents in a user-friendly way
	Users need to be able to convert text to speech automatically
	Users need to be able to easily export content
	Users need to be able to customise the tools and interface
	Users should be able to select languages other than English
Adding audio-visual content	users need to have access to stock files for audio-visual material
	Users need to be able to embed links to additional (audio-visual) content in the text
	Users need to be able to equalise different audio tracks when combined
	Users need to be able to cut (and modify) the uploaded audio
	Users need to be able to record audio directly into the creator tool
	Users need to be able to import external audio files
Writing tools	users need to be able to check the word frequency in their writing
	Users need to be able to check writing statistics (such as wording and phrasing)
Collaborative features	Users need to be able to share projects with others
	Users need to be able to collaborate on projects (books) with others
Receiving feedback from readers	Users need to be able to receive feedback from readers on texts published via the creator tool
Data	Users need to be able to receive data on their reader base on texts published via the creator tool (socio-demo and user data)
	Users need to be able to receive data on the emotional response of readers of the texts published via the creator tool
	users need to receive data on the products they have published via the creator tool

Table 24. User requirements Creator

4.2.2 Impact assessment

The impact assessment of the Möbius Creator during PP3 follows the areas, dimensions and indicators established in the IAF, reported in D2.3 and summarised in Table 25. As already noted in the previous Pilot Phases, not all dimensions emerged as relevant; only the dimensions that emerged as relevant are discussed here - highlighted in grey.

Impact area	Dimension	Indicator
Social impact	Impact on education	Increased digital skills for authors
		Increased writing skills for authors
		Increased digital skills for content creators
		Increased engagement with prosumers
Economic impact	Impact on cost reduction	Cost saving for cross-media productions
		Scalability
		Time saving for cross-media productions
	Impact on production processes	Change in production practices due to stakeholder use of the tool
		Ease promotion of contents
		Increase collaboration of cross-media productions
		Increase insights based on user data
Technological impact	Impact on ICT-driven innovation	Number of users of the Möbius Creator
	Impact on the use of technology	Co-created tool meeting the users' requirements
		Increase the fruition of multimedia book experience
		Lowering the technological barrier making an easy tool for all ages
		Rate of satisfaction using the toolkit
		Usability: easy to learn, use, remember

Table 25. Impact areas, dimensions and indicators for the Creator as defined in the IAF (D2.3)

Social impact: Impact on education

As described in D2.3, impact on education is a social impact dimension that includes digital skills (levels of know-how, ability, and awareness in the use of ICT devices) and writing skills of professional and amateur authors. These skill categories are considered in terms of education because digitisation is transforming the output of writing and reading (e.g. eBooks) but also the workflow-experience (e.g., by digital apps and software). In the case of the Möbius Creator, impact on education concerns changes in the skills of the end-users due to the use of the toolkit. In particular, two dimensions are analysed:

- Increase in writing skills for authors.
- Increase in digital skills for authors and content creators

The dimension "writing skills for authors" was targeted with the question "By using the Möbius Creator toolkit, I will improve my writing skills as an author" (Figures 15-16). The majority of the responses (38.9%) fall in the middle (3 on a Likert scale 1-5) with more responses leaning towards the lower part of the Likert scale. Despite expectations that emerged in PP2 that the

use of the Creator toolkit would have a greater impact on the writing skills of authors, the assessment of this aspect of the toolkit by potential users leans towards the negative side.

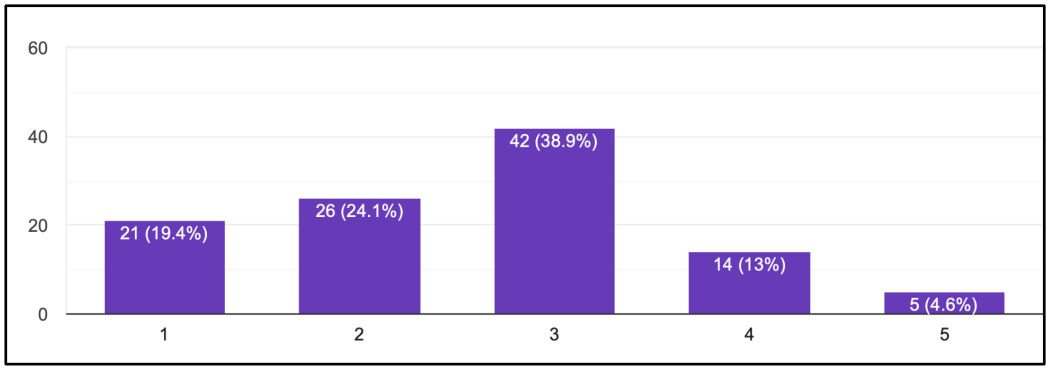

Figure 15. Responses (108) to the question "By using the Möbius Creator toolkit, I will improve my writing skills as an author."

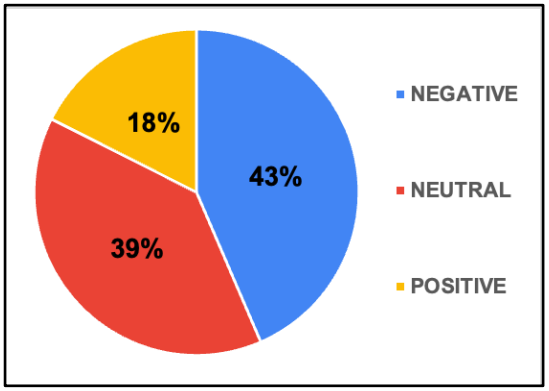

Figure 16. Pie chart with responses in % to the question "By using the Möbius Creator toolkit, I will improve my writing skills as an author."

In terms of digital skills for authors and content creators, this was targeted with questions on the improvement of digital skills for authors and content creators respectively. As shown on Figures 17-18, the majority of the responses (34.5%) fall in the middle (3 on a Likert scale 1-5) with slightly more responses leaning towards the positive side. Considering that the Creator is a digital tool which targets the creation of immersive books employing technological advances such as 3D audio, then the improvement of digital skills for authors is a natural consequence.

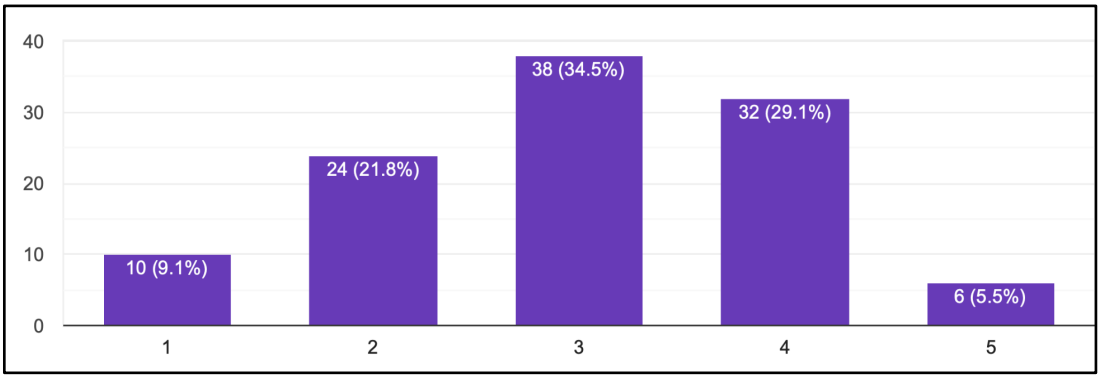

Figure 17. Responses (110) to the question "By using the Möbius Creator toolkit, I will improve my digital skills as an author."

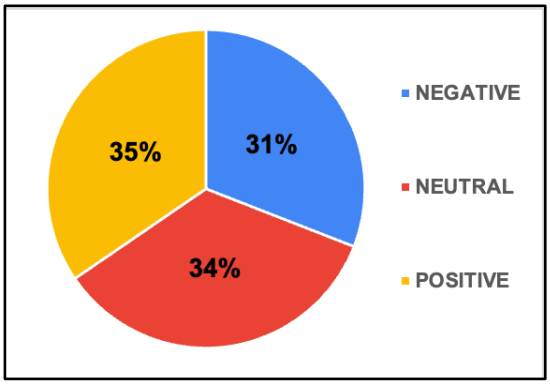

Figure 18. Pie chart with responses in % to the question "By using the Möbius Creator toolkit, I will improve my digital skills as an author."

Looking now at content creators and considering that the Creator can be used not only by people who identify as writers/authors in the traditional sense, it is observed that the majority of responses (33.6%) fall again in the middle (3 on a Likert scale 1-5) with more responses leaning toward the positive side (Figure 19). The responses by users who see themselves as content creators highlight the potential of the Creator tool as a way of enhancing digital skills and competences.

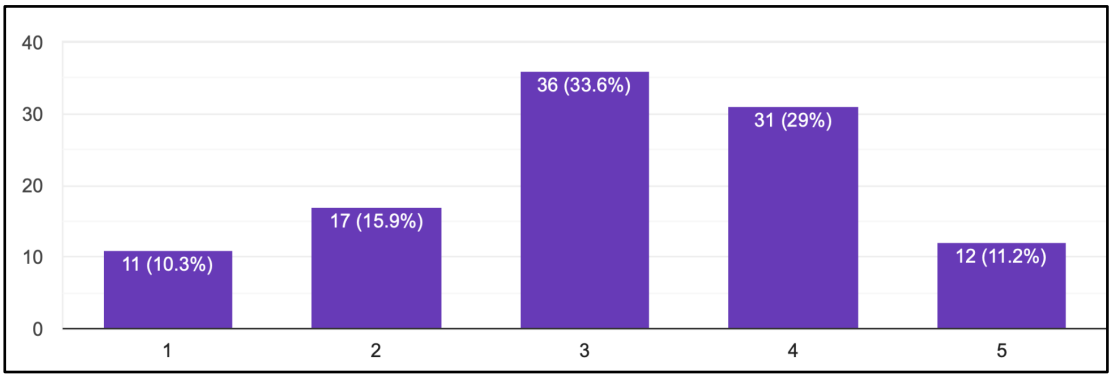

Figure 19. Responses (107) to the question "By using the Möbius Creator toolkit, I will improve my digital skills as a content creator."

Overall, the Creator toolkit seems to have a greater impact on the digital rather than on the writing skills of the potential users, unlike the expectations that had emerged during PP2.

Economic impact: Impact on cost reduction and on production process

The economic impact of the Möbius Creator toolkit involves the dimensions on cost reduction and on the production process. Cost reduction as an indicator of economic impact is related to the fact that innovation causes optimisation of resources, an aspect that can be observed in various areas within the book and publishing industry. Cost reduction is explored through changes in the amount of money and time involved in certain processes.

Looking at the responses to the questions on cost and time savings for cross-media production through the use of the Creator toolkit, quite similar percentages were observed (Figure 20). The majority of the responses (36-38%) fall in the middle (3 on Likert scale 1-5) with more responses falling on the negative side than on the positive. This shows that the confidence in the potential of the Creator toolkit to reduce cost and time in cross-media productions is medium to low.

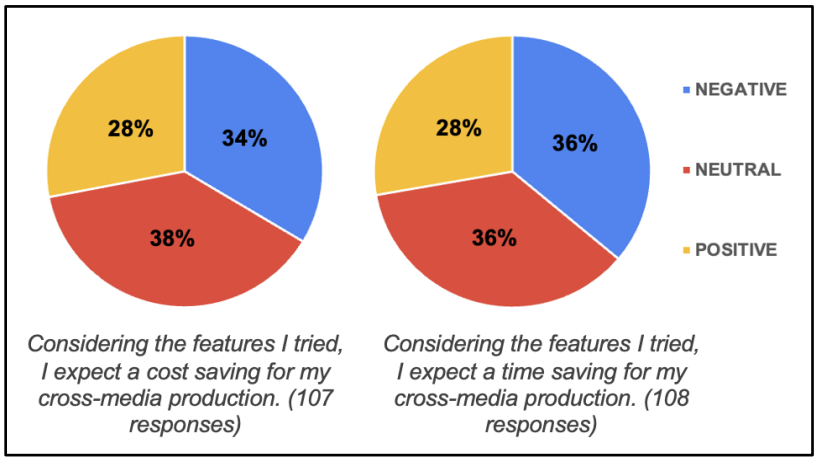

Figure 20. Pie chart with responses in % to the question "Considering the features I tried, I expect a cost / time saving for my cross-media production."

Impact on production processes as another dimension of economic impact is related to the changes triggered by the use of innovative tools by stakeholders and the flow of data and knowledge generated by prosumers.

In order to analyse changes in production practices due to stakeholder use of the tool users were asked to consider their expectations in improving current practices for cross-media production through the use of the Creator toolkit (Figure 21). The majority of the responses (30%) fall in the middle (3 on a Likert scale 1-5) with almost equal percentages of responses on either side of the scale. Similar percentages were observed in the responses to the question targeting an easier promotion of cross-media content (Figure 22); 34.2% of responses fall in the middle (3 on Likert scale 1-5) with almost equal percentages of responses on either side of the scale.

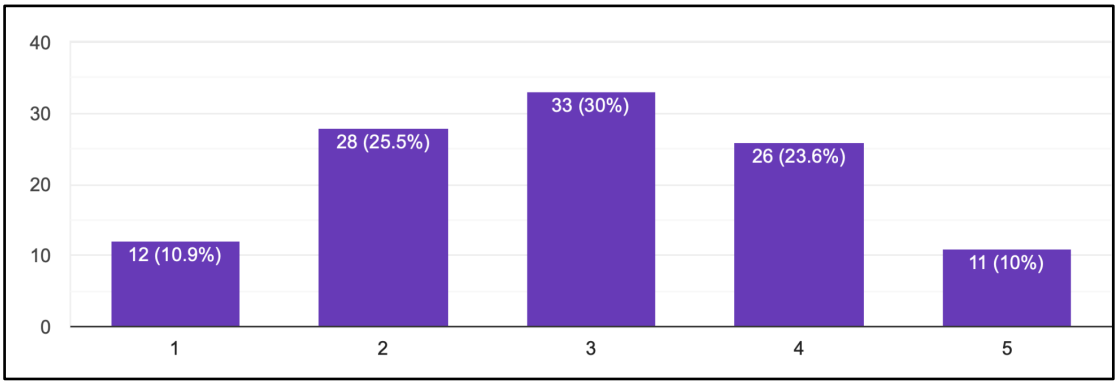

Figure 21. Responses (110) to the questions "Considering the features I tried, I expect the Möbius Creator will help me in improving my current practices for cross media production."

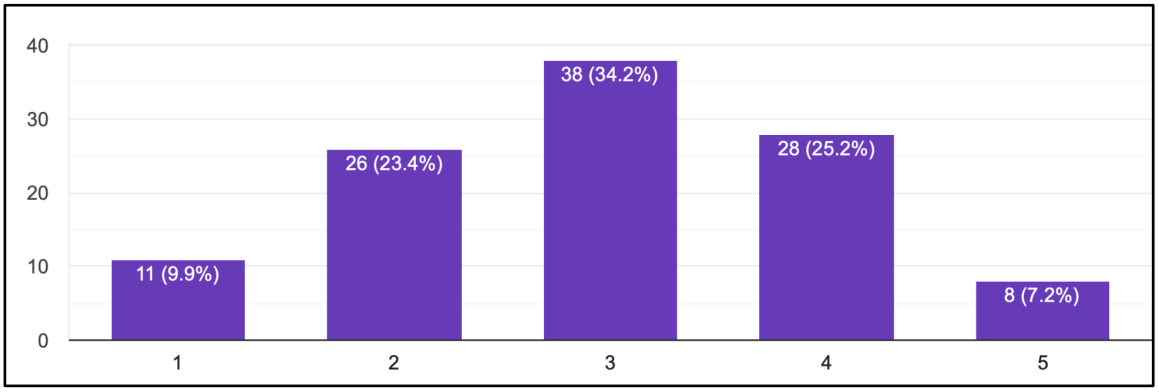

Figure 22. Responses (111) to the question "Considering the features tested, the Möbius Creator will help me in the promotion of my content."

The final indicator of economic impact that was explored during PP3 targeted a possible increase of collaborations with professionals from other media sectors (Figures 23-24). While 32.7% of the responses fall in the middle (3 on Likert scale 1-5), an additional 44,6% of positive responses is observed, highlighting the expectations of the users in terms of stimulating new cross-media collaborations through the use of the Creator.

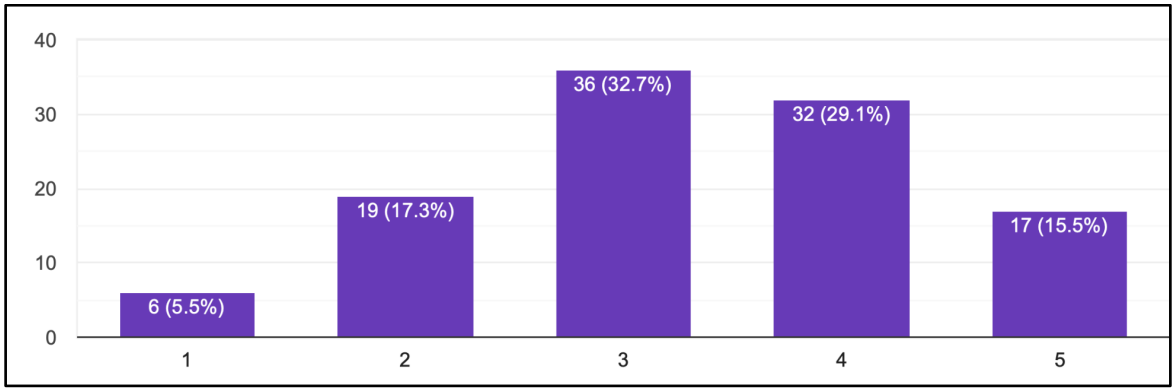

Figure 23. Responses (110) to question "I think Möbius Creator can stimulate new collaborations with professionals from other media sectors."

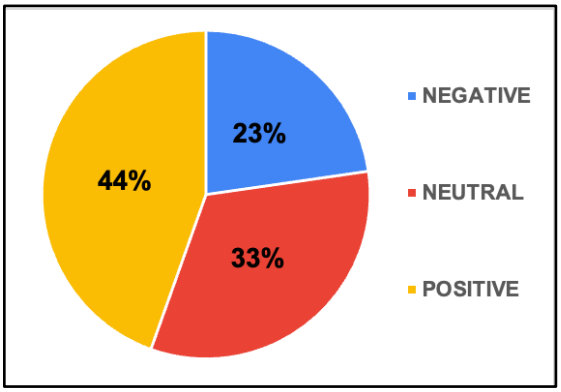

Figure 24. Pie chart with responses in % to the question "I think Möbius Creator can stimulate new collaborations with professionals from other media sectors."

Technological impact: impact on the use of technology

The technological impact is explored through the dimension of the impact on the use of technology. In order to assess this dimension, the rate of satisfaction and usability was analysed using different indicators.

The rate of satisfaction in using the Creator toolkit is targeted through four different questions illustrated in the figures below. The overall rate of satisfaction falls equally in the middle and the positive side of the scale with 37.8% respectively. However, a slightly higher percentage of respondents 36% vs 32% would not recommend the toolkit to others (Figure 25).

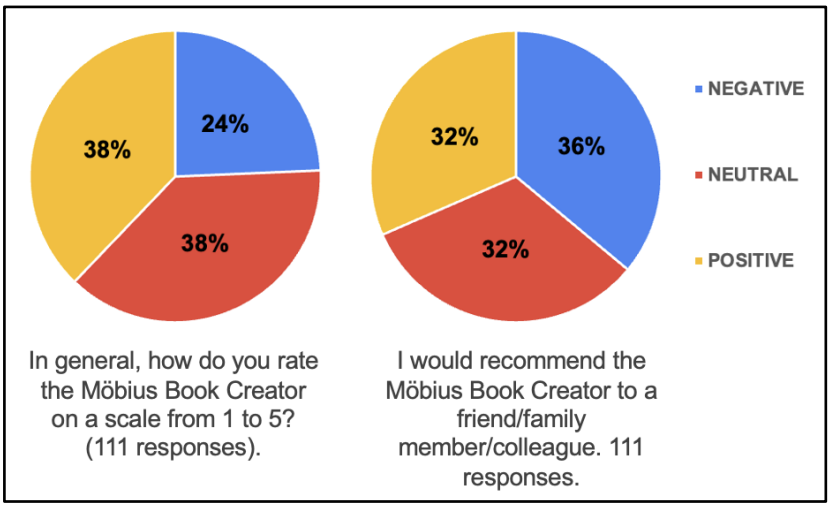

Figure 25. Pie chart with responses in % to the questions "How do you rate the Möbius Book Creator" and "Would you recommend the Möbius Book Creator to others?"

This negative perception is supported by the following two questions which targeted whether the Creator works the way that user wants and whether users would use the Creator often. The negative responses, shown in Figures 26-27, highlight a low rate of satisfaction of the tool among the testers. In particular, 41.4% of the respondents indicated that the tool does not work as they want it to, possibly highlighting issues in the usability of the tool. Similarly, 54% of the respondents indicated that they would not want to use the Creator frequently.

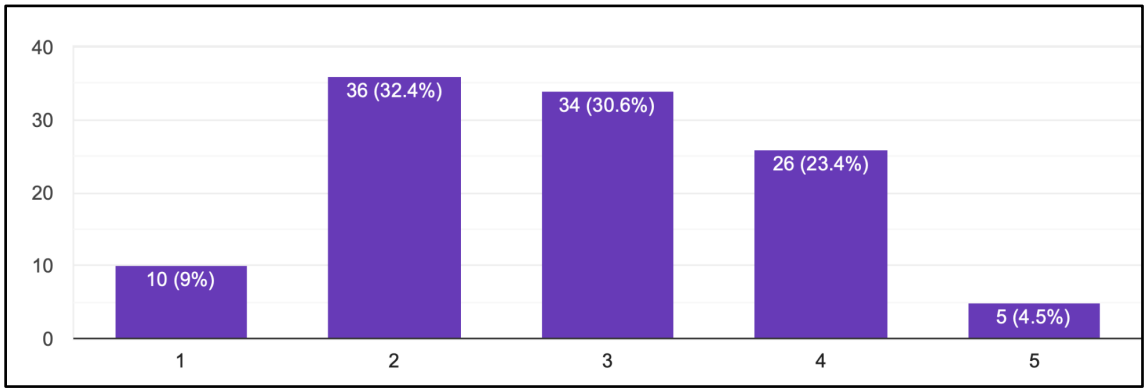

Figure 26. Responses (111) to the question "The Möbius Book Creator works the way I want it to work."

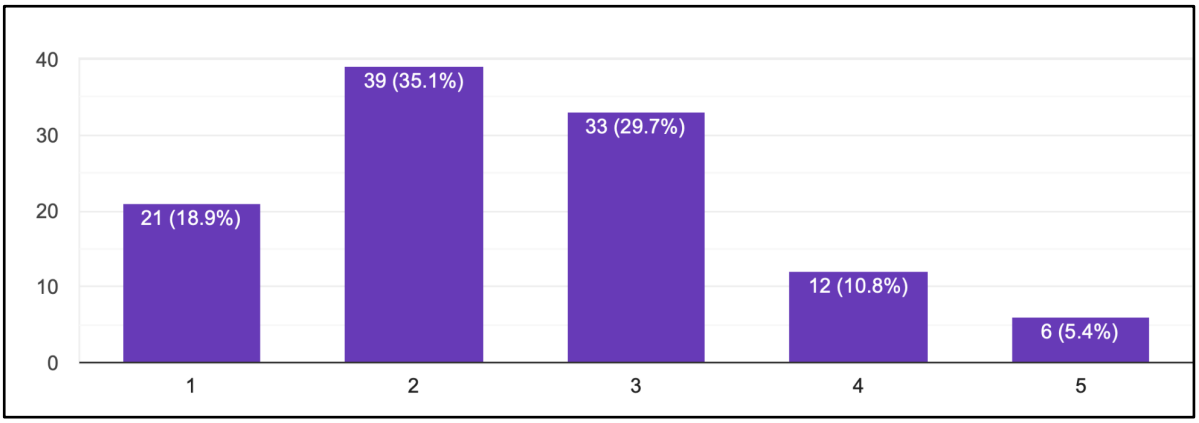

Figure 27. Responses (111) to the question "I would like to use the Möbius Book Creator frequently."

In terms of usability of the Creator toolkit, i.e. easy to use, easy to learn and easy to remember, responses are almost equally divided along the Likert scale, as shown on Figure 28.

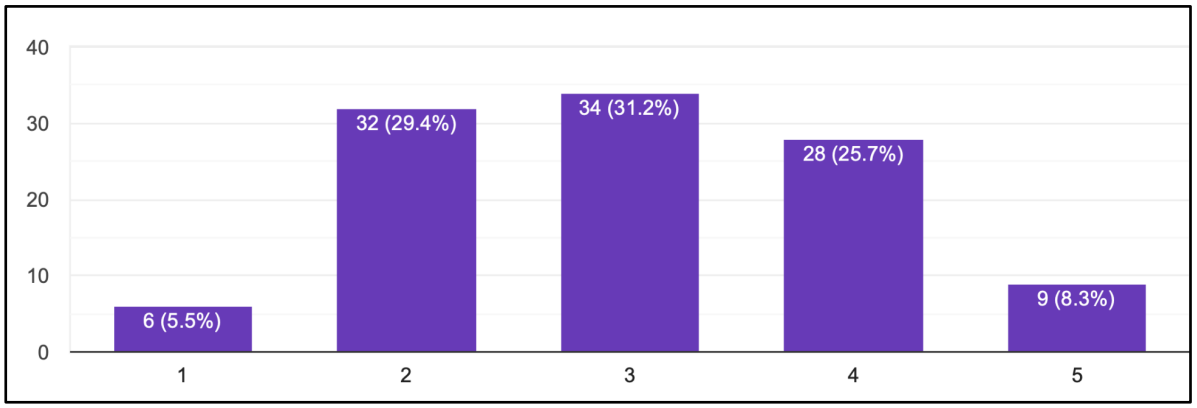

Figure 28. Responses (109) to the question "In terms of ease of use, how do you rate the Möbius Book Creator?"

Specific features of the Creator toolkit, such as the creation of a book, a chapter and of 3D audio were targeted with specific questions. These questions were supplemented with additional inquiries into whether users would be willing to use these tools often in creating more books, chapters, and 3D audio respectively. The answers, shown in Figures 29-30 present a

contrast. Even though the creation of a book and/or a chapter are considered as easy tasks, users would not use the toolkit for such tasks. It should be emphasised here that these tasks relate to more traditional aspects of book writing. It is possible that authors do not feel that such a tool would particularly help these tasks. This perception can be related to the perception of the improvement of the writing skills of authors, discussed above as a potential social impact from the use of the Creator. It is suggested that users do not expect that the use of the Creator will offer improvements in traditional skills of book writing. The limited responses (3) from the Hotjar survey, on the ease and willingness of creating more books point to the same direction.

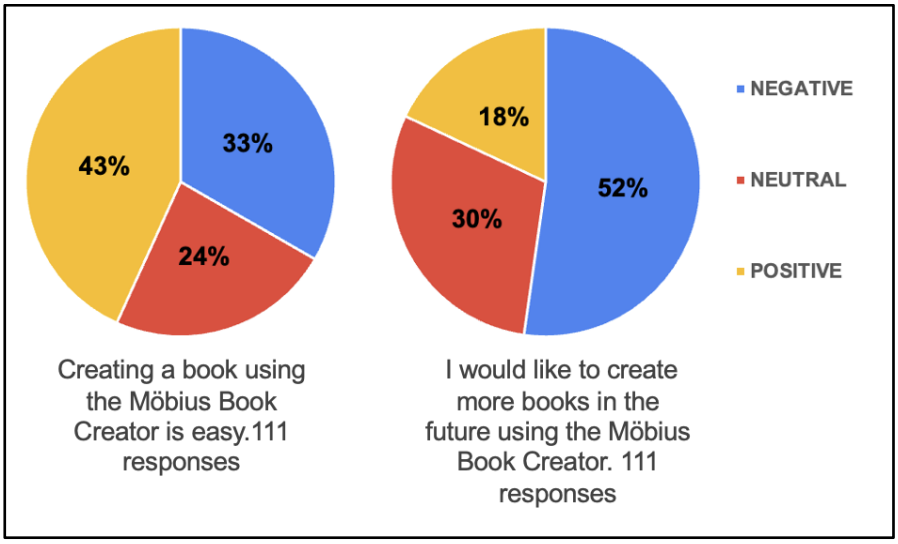

Figure 29. Pie chart showing responses in % to the questions "Creating a book using the Möbius Book Creator is easy" and "I would like to create more books in the future using the Möbius Book Creator."

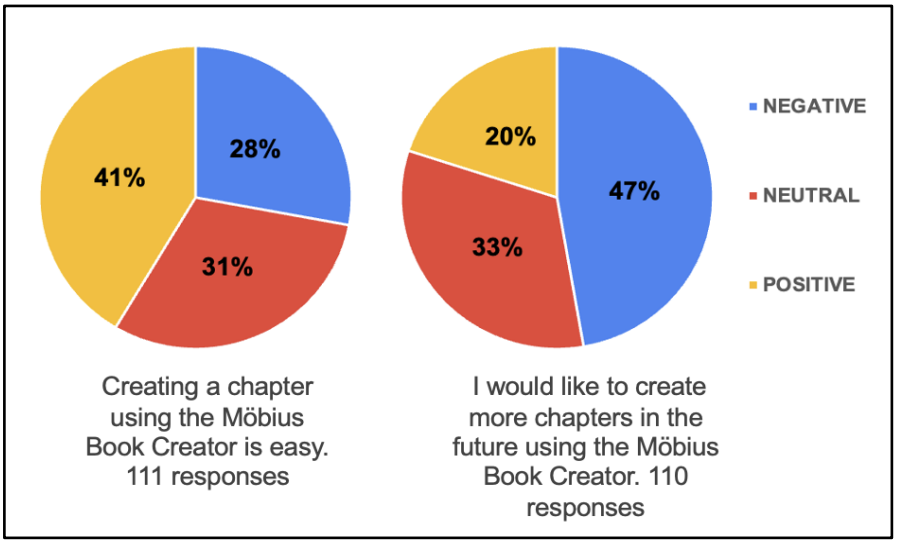

Figure 30. Pie chart showing responses in % to the questions "Creating a chapter using the Möbius Book Creator is easy" and "I would like to create more chapters in the future using the Möbius Book Creator."

A slightly different image is portrayed from the assessment of usability and willingness to use the 3D audio creator, as shown in Figures 31-32. The majority of the responses fall in the

middle of the Likert scale 1-4 followed by negative responses. In this case, the more ambivalent nature of the responses may be related to the fact that this is a technological feature of the toolkit.

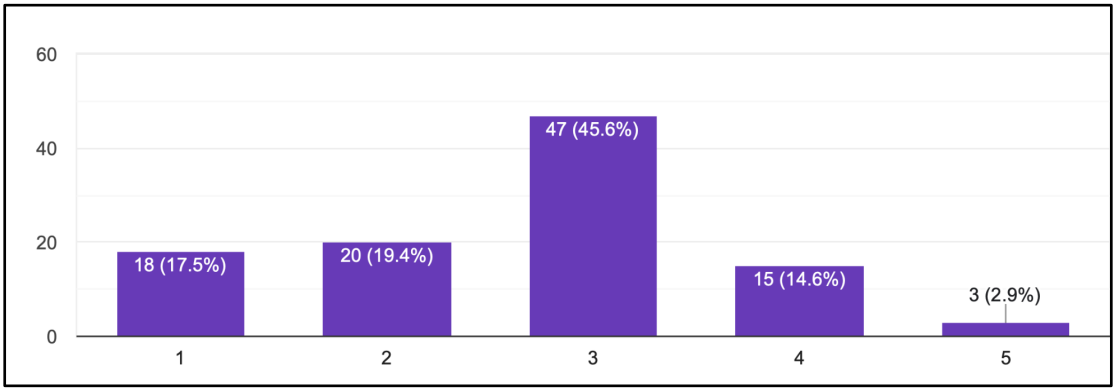

Figure 31. Responses (103) to the question "The 3D audio creator is easy to use."

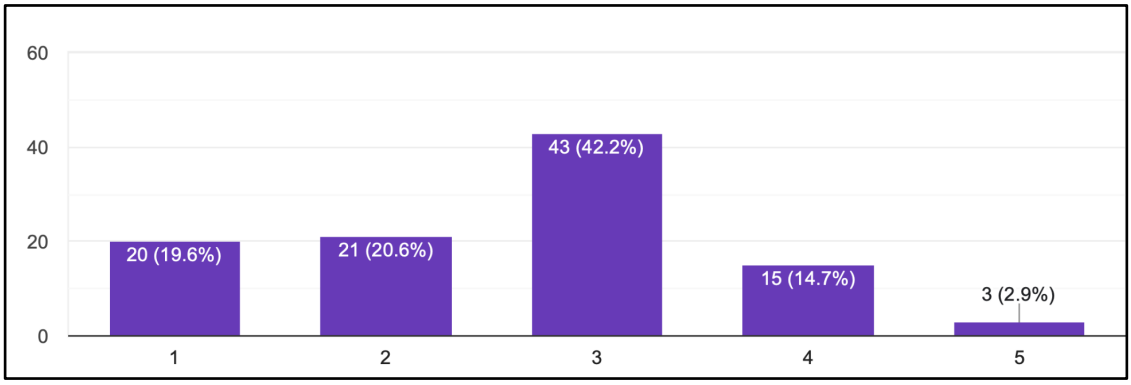

Figure 32 Responses (102) to the question "I would like to use the 3D audio creator more in the future."

Finally, as it is shown in Figure 33, 60% of the respondents indicate that adding video, images, and audio to the book is easy.

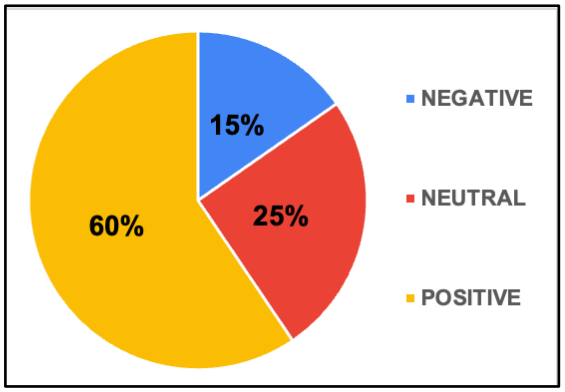

Figure 33. Pie chart showing responses (111) in % to the question "Adding video, images, and audio to the book is easy."

Overall, despite the fact that the various features of the Creator toolkit have been described as easy to use, according to the data received, the potential users do not seem willing to use the tools frequently in the production of content. This indicates a low impact on the use of technology and possibly highlights deeper issues with the usability of the toolkit and the satisfaction of the users.

The results reported above on the Creator are in line with findings from the Hotjar survey (albeit a very limited number of responses).

4.3 Möbius Player: results of evaluation and assessment

This section presents the results of the user evaluation and impact assessment of the Möbius Player. These are based on the user requirements survey (filled in by 382 people) and the impact assessment survey (filled in by 171 people) conducted during PP3. The general evaluation of the tool (Subsection 4.3.1) analyses the participants' user experience with the Player. The impact assessment of the tool (Subsection 4.3.2) analyses the social and technological impacts observed. In the impact assessment survey, participants could indicate via a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) to what extent they agreed with certain statements. In total 171 people filled in the impact assessment survey, which means that the mean value indicated for each aspect is the average of all (171) scores indicated by the participants.

4.3.1 General evaluation of tool

Summary of feedback received via the user requirements surveys
From the user requirements surveys, the following key points of feedback relevant to the Player could be identified.

Respondents indicated that they found the idea of a story with pictures, videos, and 3D audio in addition to plain text interesting. They also appreciated the interactivity such as the comments and bookmarks that respondents can create in the app.

Common points of feedback were on the one hand the audio and on the other the redirection to another page when clicking on icons (links to additional content). For the audio, there were mainly many comments on the narrator's voice, which was labelled as too slow and too polished. Respondents therefore suggested changing the voice and giving more options to choose between different narrators. In addition, a lack of control over the audio was found. Respondents thus expressed a desire to have more control over the audio so that they could select audio (music, narrator and/or sound effects) and adjust the speed of the audio. The redirection to another page upon clicking icons caused respondents to be pulled out of the story. As feedback, they commented that the videos and pictures should be better placed in the text itself so that there is no redirection.

Also with the Player, it was indicated that the app is only usable in the browser and cannot be downloaded through an app. An app was considered more user friendly as it would allow the user to use the Player offline. In addition, respondents indicated the Player is not user-friendly enough. Adding a search bar and more information boxes should remedy this. The graphic

design could also be improved, which was considered too simplistic. Furthermore, respondents suggested that the app should keep track of the reading progress. Currently, when leaving the app window, respondents have to figure out for themselves where they left off when visiting the app again. This should be remedied. There was also a lack of personalization options, respondents would prefer if in terms of layout, the text style was editable (changing the size, colour, and font of the text) and if a dark mode could be applied. Furthermore, in terms of content, there should be more personalization options. Respondents would like to make notes in the text and be able to highlight text. Since both reading, listening, and viewing visuals requires concentration, respondents indicated that an automatic text synchronisation could help in following the narrator.

Although it was indicated that the story showcased in the Player is just an example, respondents still indicated to provide more content in the app, so that they have more examples of immersive stories. Looking at the potential of the app, some respondents indicated that the app is nothing new. According to them, there are other apps currently available that are more technologically advanced. This means that the app still needs to be optimised so that it is preferred over other apps. This is also necessary to convince people who usually read on paper to consume immersive stories through the Player.

Still, respondents especially indicated that the Player could be of interest to children and young people. This is because they could learn a new language through the app and also because they have grown up with digital devices. Also, for people who normally do not read as much in the traditional way, this tool can make them consume stories through the Player.

Table 26 below presents a summary of the feedback received via the user requirements survey.

Questions	Feedback
What is your first impression of the app?	Positive: ● Good idea of adding photos, videos, and 3D audio next to text ● Easy to understand, use and navigate ● Like design Neutral: ● Good, but room for improvement Negative: ● Limited book selection ● Outdated ● Nothing special/different ● Difficult to understand, use of navigate
What do you like about the app?	● Multimedia experience (audio) ● Easy to understand, use and navigate ● Design and lay-out ● Interactivity (comments & bookmarks)
What do you dislike about the app?	● It's digital ● Audio ○ Narrator's voice (too slow, too polished) ○ Lack of control over audio ● Only usable in browser

	• Layout
	  ○ Not user friendly
	  ○ Poor graphic design
	  ○ App doesn't keep track of reading progress
	  ○ Lack of options to personalise layout (text style editing, dark mode)
	• Implementation from idea to result (too simplistic)
	• Distracting the user experience
	  ○ Redirection when clicking on icons
	  ○ Audio, images, and videos are distracting for the reading experience
	• Limited content

Do you see potential in this app? Why (not)?	Potential:
	• Interesting for certain target groups
	  ○ Non habitual readers
	  ○ For younger children/younger people
	• Interesting to learn (new language)
	• Interesting general idea of adding multimedia content to text
	Potential under condition:
	• Depending on price
	• Need more content
	• Concept needs to be executed better
	No potential
	• App is nothing new

Do you see some thresholds holding you back from using this app in the future?	• If app is not better developed • Prefer reading on paper

What would you change about the app?	• Add more content
	• Add more instructions, information (tutorial)
	• Audio
	  ○ Better narrator (+ more versions)
	  ○ More control over audio (selecting audio, change speed of audio)
	• Add typography editing options (change font, size, and colour of text)
	• UI design
	  ○ More colours
	  ○ Add audio text synchronisation
	• No redirection when clicking on icons (with additional content)
	• To be able to download Player on app (using it offline)
	• Add Interactive features
	  ○ Able to make notes, highlighting text and bookmark works
	• Add search engine

Table 26. Feedback on Player via user requirements surveys

Summary of feedback received via the impact assessment surveys and Hotjar

The feedback obtained through the impact assessment surveys and Hotjar was also used to determine the general user evaluation and provided additional insights to map the user requirements. This output is discussed in detail in Subsection 4.3.2 to avoid repetition.

User requirements

Based on the feedback obtained from PP1, PP2 and PP3, user requirements were formulated. These were arranged by category. Not all user requirements were integrated into the Player. Table 27 below presents the user requirements (the full table of user requirements, the ranking according to the MoSCoW technique and the comments by partners are accessible in this document):

Category	User requirement
Sound control	User needs to be able to adjust the volume of the audio
	User needs to be able to jump forward and backward in the text
	User needs to be able to play back (rewind).
	User needs to be able to adjust the speed of the audio.
	User needs to be able to easily mute / disable audio
Audio content	User needs to have multiple options for narration.
	User needs to have multiple options for music and ambient sounds.
	User needs to be guided to how to have optimal audio results
Audio story immersion	User needs to be able to stay in the story
Content integration	Users need to stay immersed in the story when viewing additional (audio)visual content.
	User needs to be able to pick up reading and listening from the point where they left the story
	User needs to be able to access the added media while reading
	User needs to be able to decide if they open/access additional content
Search function	Users need to be able to search specific books
	Users need to be able to search specific authors
	Users need to be able to search specific genres
	Users need to be able to search specific words or media in the books
Social dimension	Users need to be able to interact with other users
	Users need to be able to share what they are reading with friends Users need to be able to see what friends are reading

	Users need to be able to recommend books to friends Users need to be able to receive book recommendations based on their network
Navigation	Visual impaired users need to be able to use the application
	Users need access to a variety of content
	Users need to be able to mute / switch audio off Users need to stay immersed when viewing additional content
	Users need to be able to login and select content in just a few clicks
	Users need to be able to go back / go to homepage in just one click
	Users need to be able to get a short summary before opening the book Users need to be able to flip the book
Navigation and user interface	Users need to be able to switch off additional content / immersive features
	Users need to be able to bookmark in the text
	Users need to be able to see where they are in the book through page breaks
	Users need to be able to select text in the book
	Users need to stay immersed in the story when viewing additional (audio)visual content.
	Users need to be able to access the added media while reading
	Users need to be able to pick up where they stopped reading / listening
	Users need to be able to adjust the font size, font, and background colour
Library	Users need to be able to see the types of books available (genres)
	Users need to be able to see the identifiers of a book (genre, author, number of pages, short summary)
	Users need to be able to see which books they have read
	Users need to be able to see which books they are currently reading
	Users need to be able to rearrange the books in the library
Notes	Users need to be able to take notes in the book
	Users need to be able to highlight or underline text in the book
	Users need to be able to doodle in the book
	Users need to be able to select text in the book
Buttons, links, and redirection	Users need to be able to easily access additional content
	Users need to stay immersed in the story when viewing additional (audio)visual content.

	User needs to be aware of the redirection when opening additional content
	User needs to be able to decide if additional content is opened or not
	User needs to be able to decide if additional content is shown or not
Content	Users need to stay immersed in the story when viewing additional (audio)visual content.
	Users need to stay immersed in the story when viewing additional (audio)visual content.
Audio tracks	Users need to be able to adjust the volume of the audio tracks
	Users need to be able to adjust the speed of the narration
	Users should be able to choose from a variation of audio tracks, including different narrators, ambient sounds, and music
	Users should be able to adjust the highlights aesthetics
Content requirements	Users need to able to choose audio from a wide variety
Design of interface	Users need to be able to switch to dark mode
	Users need to be able to see their statistics
	Users need to be able to set a sleeper timer
	Users need to be able to personalise their interface
	Users should be able to take notes
	Users should be able to highlight or underline
	Users should be able to bookmark
	Users should be able to save content(snippets) to a dedicated library
Social dimension	Users should be able to share notes
	Users should be able to discuss books and stories with other users
	Users should be able to share their libraries to discover content via other users
	Users should be able to share books with others
	Users should be able to lend books to others
	Users should be able to share comments on books with others
Switching modes	Users should be able to switch to audio only by locking their screen
	Users should be able to change the audio that is playing by swiping the screen

Table 27. User requirements for Player

4.3.2 Impact assessment

The impact assessment of the Möbius Player during PP3 follows the areas, dimensions and indicators established in the IAF, reported in D2.3 and summarised in Table 28. As already noted in the previous Pilot Phases, not all dimensions emerged as relevant; only the dimensions that emerged as relevant are discussed here - highlighted in grey.

Impact area	Dimension	Indicator
Social impact	Impact on behavioural change	Accessibility to elders and people with disabilities
		Change in reading habits
		Increase in book consumption
		Increased media competences of new social groups, e.g. elders
Economic impact	Impact on cost reduction	Cost reduction for the producer
		Cost reduction per book experience for the consumer
		Entry point to other media sectors
		Platform to test new products or services
Technological impact	Impact on ICT-driven innovation	Compatibility with all devices and operating systems
		Number of users of the Möbius Player
	Impact on the use of technology	Increased understanding of the story through immersive audio
		Rate of satisfaction of people experiencing the Möbius book
		Fluent shifting between audio layers
		Usability: easy to learn, use, remember

Table 28. Impact areas, dimensions and indicators for the Player as defined in the IAF (D2.3)

Social impact - impact on behavioural change and social inclusion

According to the IAF described in D2.3 social impact is the area that more significantly expresses the ultimate direction of the project, i.e. its potential to produce change towards the general public through a set of transformations that the project entails to social groups that participate in the process. Looking specifically at the impact on behavioural change, this is the most easily observed effect of the introduction of a new technology into the society and it can be observed in changes in daily routines, in the way of using devices or even in the social relations that are mediated by technology. The indicators used for the Möbius Player are changes in reading habits, increase in book consumption and accessibility to older adults and people with disabilities.

A potential increase in book consumption, which in turn reflects a potential change in behaviour, was targeted with the question "Do you think that the Möbius Player can increase

your book consumption?" (Figure 34). The responses are divided almost equally among "yes", "no" and "I don't know", with slightly higher percentages for the ambivalent (35.9%) and the negative answers (32.9%).

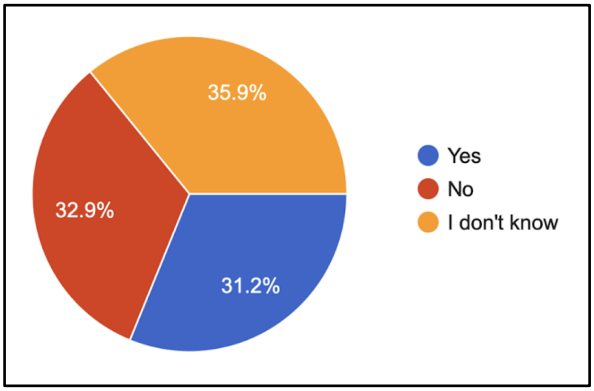

Figure 34. Responses (170) to the question "Do you think that the Möbius Player can increase your book consumption?"

A potential change in reading habits was targeted with the question "I would like to use the Möbius Book Player frequently" (Figure 35). A quarter of the responses (24.6%) fall in the middle. While the negative and positive responses are almost equally divided on either side of the scale, the positive responses are slightly more - 40.4% vs 35.1%. The desire to use the Player frequently by more than 40% of the respondents indicates a willingness to consume more books through this innovative interface.

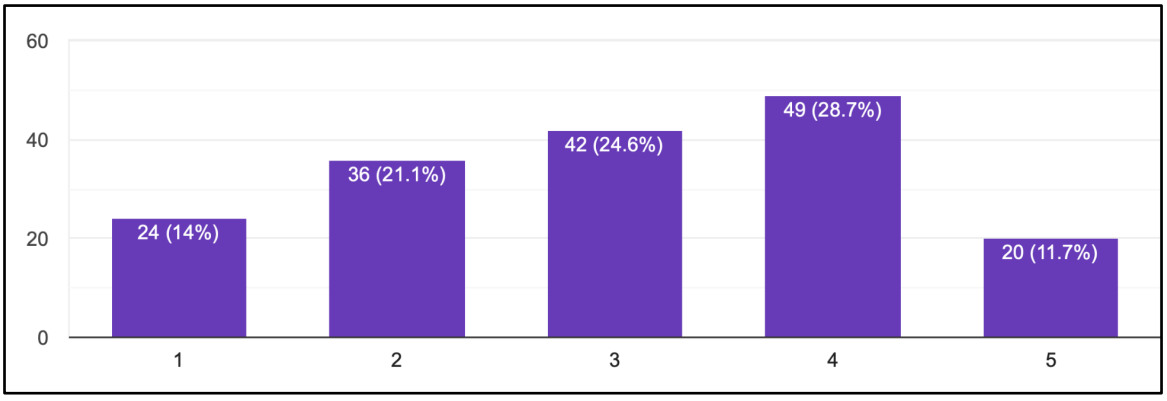

Figure 35. Responses (171) to the question "I would like to use the Möbius Book Player frequently."

Regarding accessibility to people with disabilities or older adults; even if this dimension was not investigated directly with a question, it is possible to get glimpses from the comments left by the testers in questions relevant to the 3D audio. Many users, without specifying if they have any learning disabilities have emphasised how the coexistence of various sounds, either ambient sounds, narrator or music are distracting. This could potentially create additional problems for people with disabilities. While there is research that highlights the advantages of audiobooks or the presence of music or other ambient sounds in reading and concentration, the combination of all three different audio tracks seems to hinder the experience of reading a book. One user specifically mentioned autism and how the 3D audio was distracting: *"I'm not*

sure if this is because of my autism but the 3D audio was somewhat distracting with the water sound effects."

Technological impact: impact on the use of technology

Similarly to the Möbius Creator, for the assessment of the technological impact of the Möbius Player, the impact on the use of technology is a dimension related to the transformations on end-users' behaviours and awareness in relation to technological devices and resources. In the assessment of the Möbius Player, the following dimensions were analysed:

- Rate of satisfaction of people experiencing the Möbius book
- Usability: easy to use, easy to learn
- Increased understanding of the story through immersive audio
- Fluent shifting between audio layers

The first indicator of satisfaction consists of a general evaluation (i.e. "rate the application"), with the majority of the responses (53.5%) on the positive side of the scale, shown on Figure 36 below.

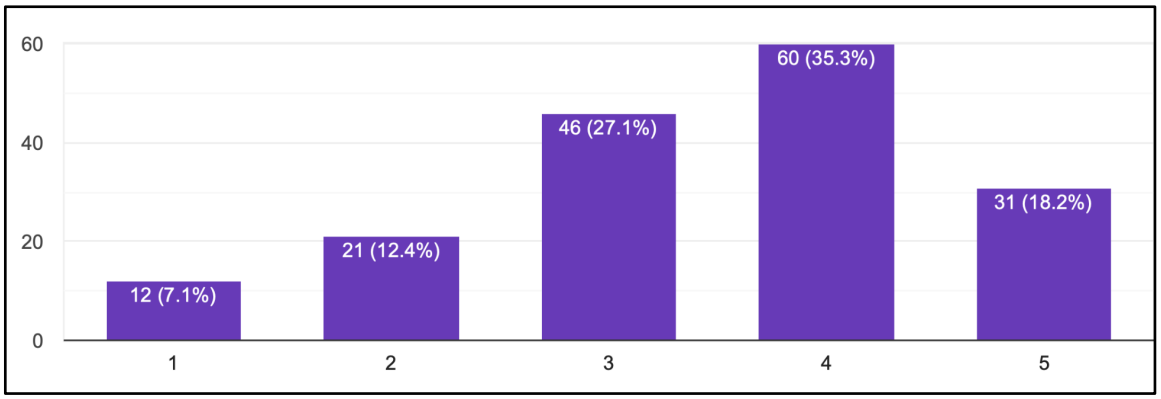

Figure 36. Responses (170) to the question "In general how do you rate the Möbius Book Player on a scale from 1 to 5?"

A similar positive trend is indicated by the willingness of people to recommend the Player to others (46%). Finally, the majority of testers (41%) indicate that the Player works the way they want it to work (Figure 37). These indicators of the rate of satisfaction of people experiencing the Möbius Player highlight an impact on the use of technology. Compared to similar questions asked for the Creator, more positive ratings were observed for the Player. This could be attributed to the fact that the Creator targets not only prosumers and content/cross-media creators but also writers and authors who are perhaps more comfortable in using traditional methods for their work. On the other hand, the Player targets prosumers and any user who wants to consume books, stories, and other content in an immersive way. The target audience of the Player is wider and reaches less traditional sectors; thus, overall ratings of satisfaction are expected to be higher.

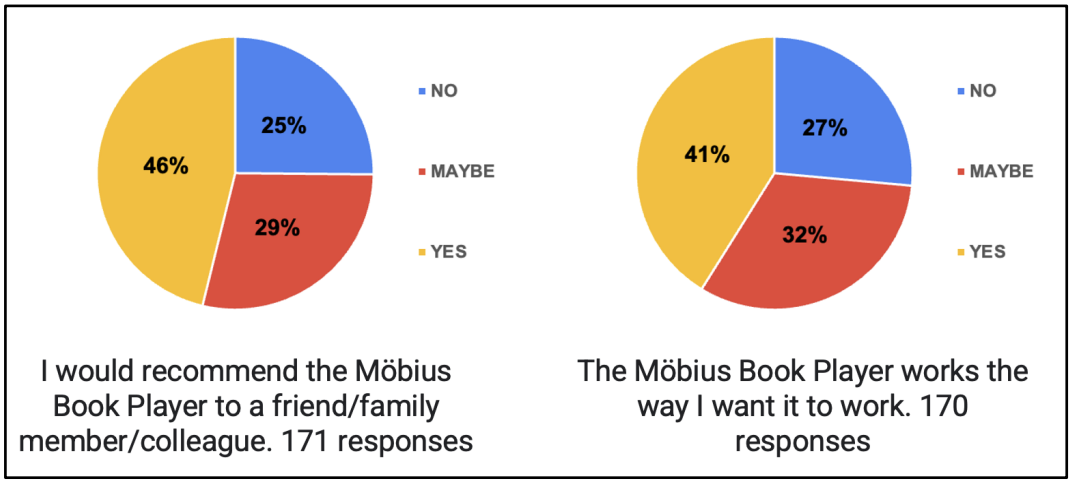

Figure 37. Pie charts showing responses in % to the questions "I would recommend the Möbius Book Player to others" and "The Möbius Book Player works the way I want."

The second indicator of technological impact is usability, i.e. how easy it is to use and learn the Möbius Player. The overall ratings for the usability of the Player are positive, as shown in Figure 38, with 67.9% of respondents on the higher end of the Likert scale.

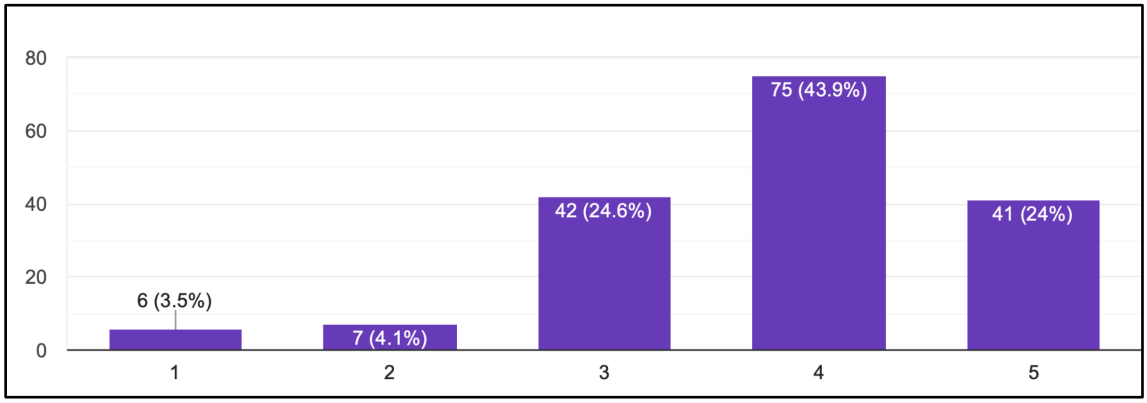

Figure 38. Responses (171) to the question "In terms of ease of use, how do you rate the Möbius Book Player?"

In order to explore further this dimension and to better understand the role of the 3D audio, one of the most important and innovative features of the Player, testers were asked to evaluate the following statements, on a Likert scale 1-5, where 1 equals "strongly disagree" and 5 equals "strong agree".

- The 3D audio helps me understand the story
- The 3D audio helps me immerse in the story
- The 3D audio hinders my focus when reading

The results have been grouped into "negative" (1-2), neutral (3) and positive (4-5) answers and are presented in Figure 39 below. First, it is observed that according to the majority of the respondents the 3D audio helps them understand and become immersed in the story, followed by an almost equal percentage of neutral responses and a much lower percentage (10-12%) of negative answers. Looking at the potential of the 3D audio to hinder the reading, the replies

are more equally divided among the three possibilities. 41% of the respondents are neutral, 34% are negative, i.e. the 3D audio does not hinder their focus and 25% are positive, i.e. the 3D audio hinders their focus.

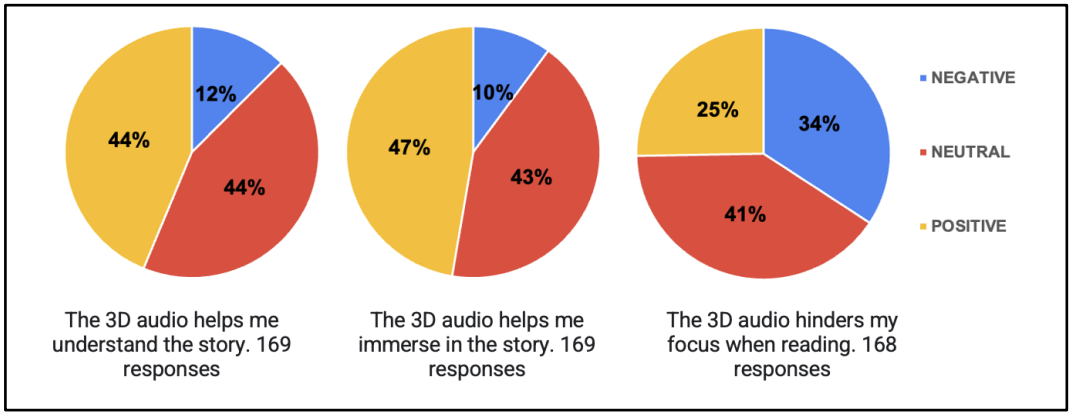

Figure 39. Pie charts with responses in % to the questions "The 3D audio helps me understand the story / helps me immerse in the story / hinders my focus when reading."

The ambient sound is the component that emerges as the most helpful part of the 3D audio, followed by the narrator and the music. At the same time, the ambient sound is also the component that hinders the focus when reading according to the testers who found the 3D audio distracting (Figure 40).

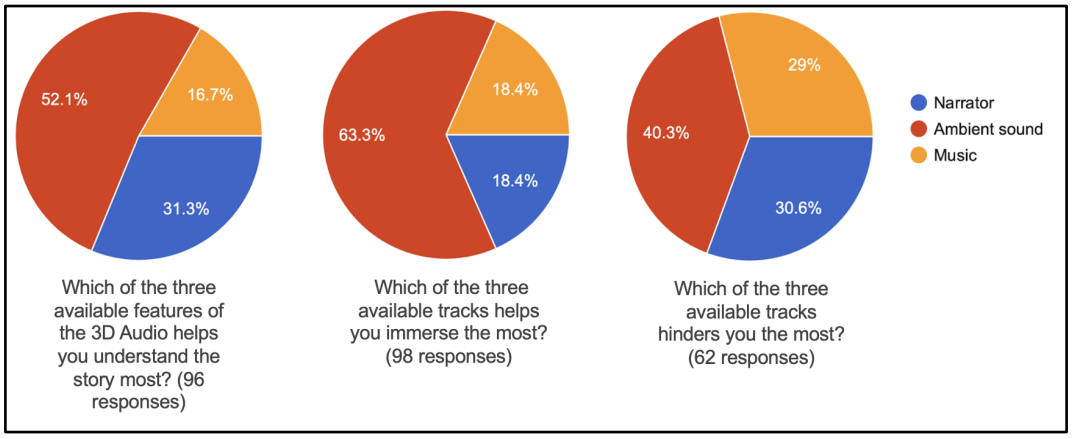

Figure 40. Pie charts with responses in % to the questions "Which of the three available tracks helps you understand the story the most / helps you immerse the most / hinders you the most?"

The answers to these questions were further elaborated with written comments by the users, which proved to be particularly useful; these are summarised here. According to 12.4% of the respondents, the 3D audio does not help them to understand the story. As possible reasons for this, the testers indicated the following: the video distracted them from the story, it was hard to concentrate with reading and listening at the same time, the sounds were not precisely aligned with the text and this created issues in reading and listening, the audio was distracting, there was an overwhelming amount of acoustic and visual information, low quality of the 3D audio, the way that the 3D audio was played (using different channels) was confusing and

distracting, annoying voice of the narrator. In terms of suggestions for improvement, it was pointed out that a higher quality of 3D audio would help, as well as the ability to choose between different tracks and shorter sections of 3D audio that could be played instead of the entire book/chapter. Similar reasoning was also provided by the 10% of the respondents who pointed out that the 3D audio does not help them immerse in the story the reasons given are similar to the above. It is interesting to point out the following comment: *"I think audio distracts me from my own imagination of the story, and also if the narrator doesn't fit your preference of a reader, it's more likely to distract you than help you"* which highlights the individual nature of the reading experience, how personal preferences are very important in rating such tools and the role of imagination in reading, an element that was also brought up in the PP1 and PP2. Finally for the 20% of the respondents who said that the 3D audio hinders their reading, the feedback was also very similar.

The third indicator of technological impact was the ease in choosing a theme; the majority of users (56.3%) responded positively. The fourth indicator was the fluent shifting between audio layers, which was also regarded positively by 55.7% of the respondents. This indicator was supplemented by the question on whether it was easy to switch between audio and reading; 68.8% of the respondents reacted positively to this.

The final indicator of technological impact was targeted with the question "The Möbius Player allows me to better understand the story" (Figure 41).

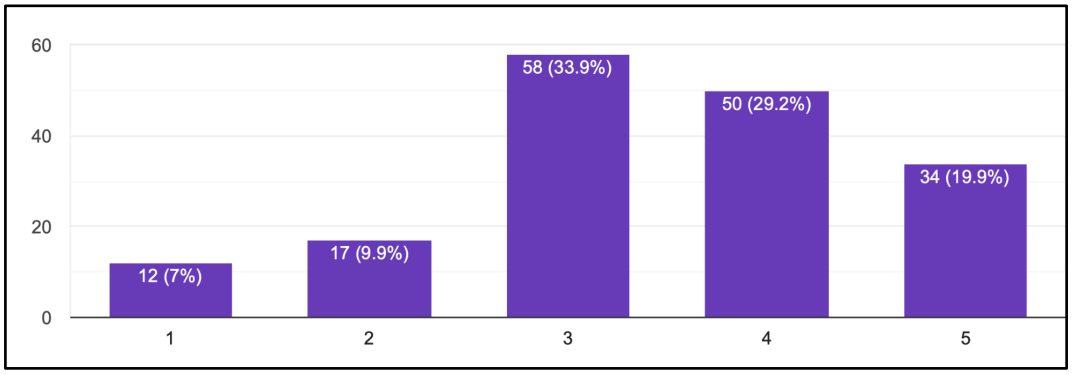

Figure 41. Responses (171) to the question "The Möbius Player allows me to better understand the story."

While about a third of the respondents (33.9%) are neutral, 49.1% reacted positively. This result, i.e. the capability of the Player to help users in understanding a story better, could be connected to a potential increase in book consumption from the perspective of the users. This also allows us to read the responses of the testers regarding their potential increase in book consumption, discussed above, from a different lens. Despite the fact that more neutral and negative responses were received, this final question on the Möbius Player shows that such attitudes cannot always be measured accurately in a linear way and can be affected by many internal and external parameters.

Overall, it is observed that the technological impact of the Möbius Player is more relevant than the social impact. This is indicated by the positive responses in the overall rating of the tool and its usability. Negative reactions were reported on the quality of the 3D audio and on the

coexistence of its different components. A certain ambivalence was noted regarding the social impact of the Player. Testers are not certain on whether the use of the Möbius Player will lead to an increase in book consumption. As it was already brought up in the discussion of PP2, some users bring up the issue that the presence of images and videos does not allow the imagination of people to work, which is for many a fundamental aspect in book reading.

To conclude, it is necessary to take into consideration that the results reported above on the Player are in line with the findings from the Hotjar survey.

4.4 Möbius Prosumer Intelligence Toolkit: results of evaluation and assessment

This section presents the results of the evaluation and assessment of the PIT. The methods used to gather feedback involved surveys, in-depth interviews, and workshops with publishers. Initially, two questionnaires on Google Forms were developed, one with open-ended questions and one with closed questions along with impact questions. With the surveys, participants could test the PIT individually and then fill out the surveys; this was later adjusted due to the need for instructions while using the PIT. Consequently, interviews and workshops were conducted to explain and guide participants through the toolkit. In total, six in-depth interviews were conducted with respondents from various regions in Europe, and one workshop was held. These methods aimed to gather feedback and opinions on the use of data from online communities and the potential impact on the publishing sector, as well as on the toolkit itself.

4.4.1 General evaluation of tool

Summary of feedback received via the user requirements surveys
Partners in the project had booths at book fairs. At these events, passers-by were asked to test the PIT. A total of 15 people completed the user requirements survey. The PIT was briefly explained, then feedback on it was asked. Although few responses were obtained through the user requirements surveys, some insights could be generated; these are presented below.

Respondents found it interesting to visualise a large dataset. In particular, the design and accompanying graphics were appreciated. This gave the publishers useful insights to see how books are used and it would give them a better understanding of how customers read. According to the publishers, this could help them know which genres to focus on. Still, respondents said they were unsure who could use this tool, as it was created to visualise mainly online community data in the tool. Many publishers indicated that they are not interested in online community data or fanfiction data. They also indicated that they do not have access to community data.

The potential for them to use this tool was mainly related to the integration of sales data, which they do have access to. In terms of customization, respondents mainly thought about giving more information on how to use the tool and giving more information about the captions to the graphs. Finally, respondents indicated that if they were to use this tool in the future, there was a need for technical expertise and strong data security practices. After all, some data may be

confidential and those should be managed confidentially, according to the publishers. They wondered how the PIT handled that.

Table 29 below gives a summary of the feedback received via the user requirements surveys:

Questions	Feedback
What is your first impression of the app?	• Interesting tool to visualise large datasets • Not sure who will use it
What do you like about the app?	• Design (graphics) • Easy to use, understand and navigate
What do you dislike about the app?	• Too less information • Made for fanfiction/online communities
Do you see potential in this app? Why (not)?	• Only with right dataset
Do you see some thresholds holding you back from using this app in the future?	• No audience for tool
What would you change about the app?	• More categorizations • More information
How would our new technology fit into your current workflow or business processes?	• Useful to see how books are used
What impact do you anticipate the PIT having on your business model in terms of market positioning, competitive advantage, and customer satisfaction?	• Would understand customers better • Streamline processes
What resources and capabilities would you need to successfully integrate and utilise the PIT within your business model?	• Technical expertise • Strong data security practices • Datasets

Table 29. Feedback on PIT via user requirements surveys

Workshop

IMEC held one workshop with 18 participants at the Readmagine in Madrid on June 7th, 2023. The feedback received via a Miro board during the workshop shows that participants found the PIT user-friendly. They saw the segmentation of data as a positive point of the PIT. On the negative side, they found it bad that the PIT is only in English, they had therefore expected that the user should be able to choose the language. Another negative point was that the current statistics now seen in the PIT are not very useful for publishers or editors. Respondents reported having data around eBook characteristics and metadata, eBook categories and a database of bestsellers that they would like to integrate into the PIT. In addition, participants would like to compare content such as books by the same author. They would also find it convenient should the sentiment of comments be added in the PIT. Respondents would also like to be able to personalise the dashboard more. Finally, it came up that it is important to do enough marketing around this tool so that people know about its existence and can use it (Table 30).

Questions	Feedback
What is your first impression of the PIT?	Accessible/user friendly
What do you like about the PIT?	Segmentation of data
What do you dislike about the PIT?	• Only in English • Current metrics not very useful for publishers or editors
Which data do you have that could be integrated in a toolkit like this?	• eBook features and metadata • eBook categories • Database of bestsellers
If no current data, which data, regardless of current access would you like to integrate in a toolkit like this?	• Content comparison (books of same author or publisher) • Sentiment of comments • Customizable queries/dashboard
What are the thresholds holding you back from using the PIT in the future?	• Not enough marketing/ no invitation to discovering

Table 30. Feedback received during workshop in Readmagine Madrid

Interviews

During PP3, IMEC also conducted a set of in-depth interviews with publishers to get their opinions and feedback on the PIT. In total, six interviews were conducted during the months December 2023 and January 2024 (see Annex 2 for a list of the interview questions)

Through the interviews with publishers, several key findings emerged. Firstly, publishers are keen on user data, particularly to gauge reader sentiment towards content and to forecast sales trends. However, they showed no interest in data from fanfiction communities. Notably, publishers express concerns about the source and accessibility of data, highlighting a recurring misunderstanding about the PIT's functionality due to a lack of diverse usage examples. In the demonstration of the PIT, the data showcased was scraped from the fanfiction platform Archive of Our Own (AO3), which raised questions among publishers about its relevance to their operations. Some suggested that demonstrating its utility in various contexts could enhance their understanding of what the PIT could do for them and their organisations. Overall, publishers are primarily interested in user data that informs trends in reader behaviour, aiding decision-making processes.

Regarding the application itself, most respondents find it intriguing and potentially beneficial. They were particularly interested in understanding reader opinions and emotions, seeing potential value in content-specific insights and comparative analysis across genres. However, some express scepticism, emphasising the need for insights into broader markets beyond their own. Suggestions for improvement of the PIT include demonstrating diverse datasets, providing more nuanced content insights, and enhancing features for regional market analysis and dashboard customization. The following quotes demonstrate the points made by the participants:

"*And so, to be able to like cut out different regions and stuff. It's gonna be important because if the UK has mainly this kind of interest, it will for sure not be the same in [country]. So, like to be able to divide the data more regionally. It's gonna be quite important, I think*" (Respondent 6, 30/01/24).

"*To say that we would leave our own* [Business Intelligence] *system, that would mean that we would completely have control over the visualisation, the data, how the pages are set up so we can build it after our own needs. So, it would need to be extremely like personalized for us to be able to use it as a tool instead of our BI tools that we have today. So, it basically it would have to be free for us to build as we choose*" (Respondent 6, 30/01/24).

Integrating the PIT into their business model is seen as potentially valuable, depending on the data's origin and relevance to their strategies. While some view user data as essential for decision-making, others stress the importance of balancing it with intuition and avoiding homogenization of content offerings, as the following quotes illustrate:

"*We always want to hear the opinion of the readers, but we are not making our decision on the opinion of the reader.*" (Respondent 2, 12/12/24).

"*I don't think that it would be good if that would make everyone do the same kind of books because then it's like oh, we know where people are and what they are is. So, let's do that. I think it's necessary that some publishers keep on doing the other books. That not so many people want to read, but that are important for I don't know for society or to challenge other kind of readers and not make them feel like they are forgotten*" (Respondent 5, 22/01/24).

Barriers to implementing the PIT include accessing user data in smaller markets and concerns about data ownership and costs, as mentioned by the interviewees:

"*I don't know if it's like this everywhere, but in [country] we don't have access to many numbers like from the market… there's no independent Organism that that would give you the numbers from the market. So, we are always trying to like magically know what is happening around us?*" (Respondent 5, 22/01/24).

"*Uh, so it depends on where the data comes from how reliable it is, and I'm not even discussing things like who owns the data, because that is also, of course, in our society, a very important aspect. Who owns the big data? That's... it's worth a lot of money to sit on those. So, if you have shared information, you will only get that much you get*" (Respondent 4, 12/01/24).

The respondents all seemed to perceive the PIT as a Big Data tool, which the respondents working in smaller sized markets saw as a barrier to them implementing the tool. These respondents worried that they would not be able to collect high quantities of data due to the low number of readers which would limit their ability to make any grand strategic

decisions, and thus they were more sceptical of the PIT and how it could be useful for them. One of these respondents said that if they would be interested in real time data on 'travelling' titles (international books that would be likely to become popular in their own country), or if they would have access to this type of data, then the PIT could have been of interest.

Despite varying perspectives, the publishers interviewed indicate they would regularly use the PIT if the integrated data aligns with their interests, especially during the publication process of new books:

> "*If this would be the data from those I would look, I would go into this system at least once a day. So, it's all about where the data comes from. If it comes from one of the services, let's say it's it, it would come from Next story. I would tap into it…ohh, probably daily as well. So, it's all about where the data comes from.*" (Respondent 4, 12/01/24).

> "*I think it we would use it maybe daily or at least weekly because so we could use every time we want to talk about a book or we're trying to launch a book or an author we could see the progression of the results for that book in particular or so I think it would be something that we could use regularly.*" (Respondent 5, 22/01/24).

The results reported above are in line with the responses (5) received through the Hotjar survey.

User requirements

Based on the feedback obtained from PP1, PP2 and PP3, user requirements were formulated. These were arranged by category. Not all user requirements were integrated into the PIT. Table 31 below presents the user requirements (the full table of user requirements, the ranking according to the MoSCoW technique and the comments by partners are accessible in this document):

Category	User requirement
Dashboard (home page)	Users should be able to understand the titles of the data categories
	Users should be able to understand what the chart represents
	Users should be able to zoom in on the chart
	Users should be able to hover over the icons to get a definition of what it represents
	Users should be able to compare data from different datasets within the dashboard
Authors tab	Users should be able to understand the titles of the data categories
	Users should be able to hover over the graphs to get a definition of what it represents
	Users should be able to understand the titles of the data categories
	Users should be able to hover over the graphs to get a definition of what it represents

	Users should be able to understand the representation of the data
	Users should be able to select a specific time period for the representation of the data
	Users should be able to see what the X and Y axis represent
	Users should be able to spot future trends based on the current keywords shown in the application
	Users should be able to search per author
	Users should be able to filter the data on genre
	Users should be able to filter the data on user demographics
Books tab	Users should be able to understand the titles of the data categories
	Users should be able to spot future trends based on the current keywords shown in the application
	Users should be able to understand the titles of the data categories
	Users should be able to see lower ranking books
	Users should be able to see lower ranking keywords
	Users should be able to see books published by them
	Users should be able to look at a ranking of popularity of genres
	Users should be able to see the popularity of keywords or posts on a timeline
	Users should be able to understand the representation of the data
	Users should be able to understand the titles of the data categories
	Users should be able to understand the titles of the data categories
	Users should be able to clearly distinguish colours in the graphs
Guidance	Users need to be able to get additional information about the application
	Users need to be able to follow a tutorial for the application
	Users need to be able to access the information in different languages
	Users should be able to understand the titles of the data categories
	Users should be able to hover over the graphs to get a definition of what it represents
	Users should be able to search for specific keywords
	Users should be able to create a timeline and track keywords over time
	Users need to be able to identify the source of the data
	Users need to be able to click and expand graphs
	Users need to be able to filter data, so graphs consider their criteria
	Users need to be able to upload different datasets and compare data
	Users should be able to search for specific keywords
	Users need to be able to track books, authors, posts, and keywords
	Users should be able to create a timeline and track keywords over time

	Users need to be able to get context on the reviews (stars)
	Users should be able to clearly distinguish colours in the graphs
	Users need to be able to export the data in different formats
PIT expectations	Users need to be able to have access to relevant data on readers demographics, habits and purchasing power
	Users need to be able to import multiple datasets and compare the insights from these different datasets
	Users need to be able to track engagement with books or stories
	Users need to be able to visualise social interactions
	Users need to be able to identify trending topics

Table 31. User requirements of PIT

4.4.2 Impact assessment

The impact assessment of the PIT during PP3 was designed to follow the areas, dimensions and indicators established in the IAF, reported in D2.3 and summarised in Table 32. As already noted in the previous Pilot Phases, not all dimensions were expected to emerge as relevant.

Impact area	Dimension	Indicator
Social impact	Impact on knowledge production	Compatibility with current practices
		Increased ease of knowledge gathering
		Potential increase in insights in self-publishing
		Potential increase in knowledge in new engagement opportunities
		Potential increase in knowledge on user behaviour and market trends
		Relevance of data / knowledge / PoC
		Sustainability of knowledge production
Economic impact	Impact on organisational practices	Potential change in production value chain due to new information and data
		Potential improvements in content recommendations
		Potential increase in responsiveness to demands of users
		Potential influence on decision making processes
Technological impact	Impact on data usage	Increase in the diversity of data sources used by publishers
		Number of new datasets developed
		Quality of data output
		Smart use of data
		Use of open data

	Impact on ICT-driven innovation	Number of tools/features developed
		Number of users of the toolkit
	Impact on the use of technology	Assessing user friendliness
		Rate of satisfaction in using the toolkit
		User data: frequency of use, features/metrics used

Table 32. Impact areas, dimensions and indicators for the PIT as defined in the IAF (D2.3)

Following the framework discussed in Subsection 4.1 a Google survey was prepared for assessing the impact of the PIT (Annex 5). Despite the efforts of the consortium to organise workshops, either online or in person during events, this proved unsuccessful, and attendance was minimal. It should be emphasised here that around 500 messages were sent on LinkedIn by FMWC in order to engage with potential publishers and promote the testing of the PIT. In addition, FEP sent the PIT to their contacts together with the link for the impact assessment. Overall, none of these efforts were successful and the three responses that were collected on the impact assessment survey for the PIT cannot be used to provide an evaluation of impact of the tool.

4.5 Final remarks

4.5.1 Final remarks on the general user evaluation

In the preceding section, the results of the general user evaluation were laid out and discussed. Feedback from the user evaluation survey for the Creator, several key areas for improvement and potential strengths for the application were highlighted. Respondents appreciated the concept of crafting immersive stories with multimedia elements and saw value in its potential as a self-publishing tool. However, criticisms included the complexity of the interface and the lack of mobile accessibility, suggesting a need for streamlined processes and enhanced user experience. Concerns about legal and privacy issues were also raised. Similarly, insights from the online workshops echoed these sentiments, emphasising the app's potential but also its need for refinement and better market positioning, especially regarding offline accessibility and monetisation options.

For the Player, respondents praised its multimedia storytelling capabilities, but noted issues with audio control and layout. They desired more customisation options, such as text styling and reading progress tracking. Despite its potential appeal to children and digital natives, concerns were raised about its competitiveness in a crowded market and its usability solely within a browser.

Feedback on the PIT focused on its user-friendliness and potential utility for publishers in understanding reader behaviour and market trends. However, concerns were raised about its limited language support and the relevance of the data sources showcased during the demonstrations. Publishers expressed interest in more diverse data sets and features for comparative analysis, alongside worries about data ownership and costs, particularly in smaller markets. Despite these challenges, publishers acknowledged the potential value of the

PIT if it aligns with their specific needs and strategies, particularly during the publication process. For the PIT there is still the problem that publishers are not interested in fanfiction/community data, which is also the reason why few respondents could be collected in spite of the many efforts to get in touch with the publishers.

Finally, it should be emphasised that most of the feedback received was incorporated into the very last version of the Möbius outputs. However, as already mentioned in Subsection 4.1 the final versions of the outputs were ready only towards the very end of the project (November 2023-January 2024). Consequently, most of the feedback for PP3 relates to previous versions of the outputs. This explains why, according to a great percentage of the feedback received, many features of the outputs needed to be improved.

4.5.2 Final remarks on the impact assessment

In the previous sections, the relevant impact dimensions for the Möbius outputs, i.e. the Creator and the Player were discussed in detail. As already mentioned, it was not possible to collect data for the impact assessment of the PIT; for this the reader is referred to the discussion of the output based on the research carried out by IMEC and presented in Subsection 4.4.1. This section presents a summary of the most relevant impact dimensions for the Creator and the Player.

Social impact

Impact on education
This dimension has been explored through a potential increase in writing and digital skills for authors and content creators. The data analysis indicates a negative association between the use of the Creator toolkit and the improvement of the writing skills of authors. Despite expectations that emerged in PP2, which underline how the use of the Creator toolkit could have a greater impact on the writing skills of authors, the assessment of this aspect of the toolkit by potential users leans towards the negative side. On the other hand, there is a more positive association between the use of the Creator toolkit and the increase of digital skills for authors and content creators. Considering that the Creator is a digital tool which targets the creation of immersive books employing technological advances such as 3D audio, the improvement of digital skills for authors is a natural consequence.

Impact on behavioural change
This dimension has been explored through a change in reading habits and an increase in book consumption. The data collected presents an ambivalent situation and a rather negative association of the Player with an increase in book consumption. The ambivalence in the nature of this data is highlighted with questions that target the frequency of the use of the Player and show a high rate in the willingness to use the Player often.

Impact on social inclusion
Even though this dimension was not targeted directly in the PP3, insights from comments on the Player highlight a potential problem in the use of the tool by people with learning disabilities. Many users, without specifying if they have any learning disabilities have emphasised how the coexistence of various sounds, either ambient sounds, narrator or music are distracting. This

could potentially create additional problems for people with disabilities. While there is research that highlights the advantages of audiobooks or the presence of music or other ambient sounds in reading and concentration, the combination of all three different audio tracks seems to hinder the experience and concentration of the reader.

Economic impact

Impact on cost reduction
This dimension has been explored through a reduction in costs and time for cross-media productions. The data collected shows that the confidence in the potential of the Creator toolkit to have an impact on cost reduction is low.

Impact on production process
Impact on production processes has been analysed through three indicators: changes in production practices due to stakeholder use of the tool; easy promotion of contents and increased collaborations on cross-media productions. Regarding the first two indicators, the responses received span the entire spectrum, showing ambivalence in the perception of the potential impact of the tool in this respect. However, a positive association has been observed in the use of the Creator and the stimulation of new cross-media collaborations.

Technological impact

Impact on the use of technology
Regarding the Creator, the rate of satisfaction and the usability were analysed in order to assess the dimension of impact on the use of technology. The overall rate of the Creator toolkit is neutral to positive. However, in assessing this indicator in a more detailed manner, it is observed that the general perception is rather negative, and users would not want to use the tool frequently or recommend it to others. In terms of usability of the Creator toolkit, the responses collected are somewhat contrasting. While the evaluation of certain features such as creating a book or a chapter is positive, users would refrain from using these features. It should be emphasised here that these tasks relate to more traditional aspects of book writing. It is possible that authors do not feel that such a tool would particularly help them in these tasks. This perception can be related to the negative view of the improvement of the writing skills of authors as a potential social impact from the use of the Creator, as discussed above. It is suggested that users do not expect that the use of the Creator will offer improvements in traditional skills of book writing. A slightly different image is portrayed from the assessment of usability and willingness to use the 3D audio creator; the more ambivalent nature of the responses in this case may be related to the fact that this is a technological feature of the toolkit.

Regarding the Player, the rate of satisfaction, the usability, the fluent shifting between audio layers, and the potential of increased understanding of the story through immersive audio were analysed in order to assess the dimension of impact on the use of technology. The overall rate of the Player is positive with users being willing to recommend the output to others. The overall ratings for the usability of the Player are also positive, with a positive reception towards the role of the 3D audio in helping users understand and immerse themselves in the story. A

significant percentage (34%) of users highlight the fact that 3D audio hinders their focus when reading. This should be read together with comments on related issues: the video distracted from the story, it was hard to concentrate with reading and listening at the same time, the sounds were not precisely aligned with the text and this created issues in reading and listening, the audio was distracting, there was an overwhelming amount of acoustic and visual information, low quality of the 3D audio, the way that the 3D audio was played (using different channels) was confusing and distracting, annoying voice of the narrator. It is interesting to point out the following comment: "I think audio distracts me from my own imagination of the story, and also if the narrator doesn't fit your preference of a reader, it's more likely to distract you than help you" which highlights the individual nature of the reading experience, how personal preferences are very important in rating such tools and the role of imagination in reading, an element that was also brought up in the PP1 and PP2. The Player has also been commented positively in terms of allowing people to better understand the story.

5. Assessing the Möbius Experimental Productions

As reported in the methodological framework, DEN planned to assess specific dimensions related to the interaction of users with new technologies and their impact on the reading experience. Thus, DEN organised additional activities to map the main impacts of the immersive outputs created by the project, in particular the Immersive Experience, the MIBB and the VR headsets, during the events where these innovations had been shown. It should be emphasised that this was not included in the DoA as activities related to the role of DEN; nonetheless it was decided to proceed in order to acquire a comprehensive understanding of the impact of the immersive experiences produced as part of the Möbius project.

For the assessment of the Möbius experimental productions, at the first stage a different approach was followed than the one used for the Möbius innovations. For the first showcase of the immersive experiences at Leipzig, in April 2023, (Subsection 5.1.1) short questionnaires for interviews were prepared as well as an observation protocol. However, the response rate was not very high; thus, for the subsequent events (Subsection 5.2), it was decided to follow a more systematic approach and to use a Google Survey, consisting of 17 questions (Annex 6). The survey was shared with all the partners carrying out the piloting activities and was used to collect impact assessment data for the MIBB and the VR headsets. The form did not collect any personal data, and DEN was responsible for sharing the final numbers with the other partners.

5.1 Showcasing the immersive experiences at KKW

5.1.1 Fantastic Adventure Night

On April 28th, 2023, on the premises of KKW, in Leipzig, the Möbius project organised the first event to present to the general public two outputs of the project: the Möbius Immersive Experience and the MIBB. The event was called "Fantastic Adventure Night" and was connected to the Leipzig Book Fair 2023 (Figure 42). The event was organised by KKW and BB, the main partners involved in WP5 activities.

Figure 42. Fantastic Adventure Night at KKW - Luca Migliore, Kunstkraftwerk Leipzig

For the purpose of this report, it is important to clarify the setting of the event. The immersive experience took place in one of the largest rooms in the KKW venue: the images were projected onto three out of the four walls and onto the floor. The participants were seated in the centre of the room, while in front of them was a table with chairs for the introductory panel and the reading experience (Giulio Ravizza, the author of *The Influence of Blue* read three passages in Italian and Anne Rossburger (researcher at KKW) read the corresponding German versions). On the other hand, the MIBB was placed inside a large room, where people could walk in and out freely.

The aim of the investigation in Leipzig was to take advantage of the event in order to explore some of the dimensions for impact assessment that can be observed only when people interact directly with our immersive and innovative solutions. According to the methodological framework (reported in Chapter 1), the dimensions that can be assessed during these events and which are connected to the results of WP2 are related to social and technological impact. Preceding the event, DEN had translated the indicators into questions. The questions have been agreed and validated with IMEC. Figure 43 shows the relevant impact areas, dimensions, and indicators.

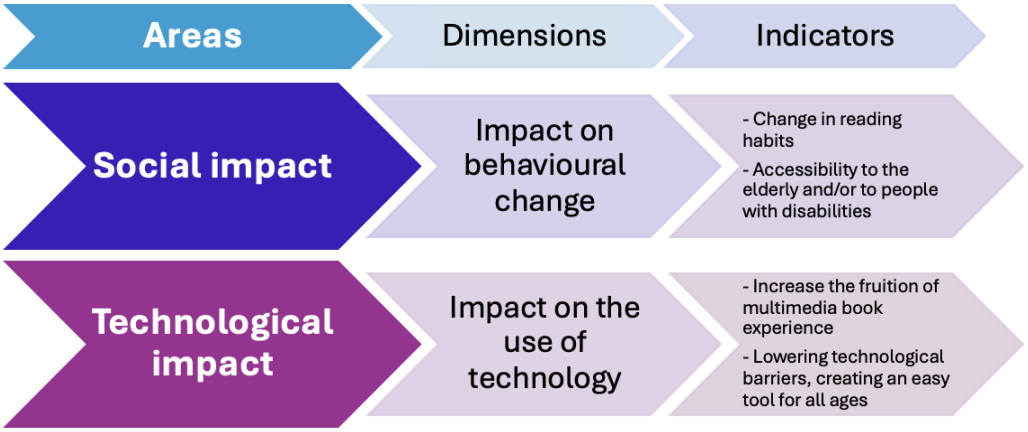

Figure 43. Impact areas, dimensions, and indicators

Protocol for data collection and analysis

A protocol was structured and shared with the partners prior to the event in order to streamline the process of data collection. The aim was to collect data for the two outputs adopting two different approaches. The reason for this was to collect the most appropriate data and achieve the best results and outcomes on the basis of the two different settings of the experiences. For this reason and due to the more static nature of the immersive experience, it was decided that it was more appropriate to investigate it through participatory observation, unlike the MIBB, which was investigated through individual interviews to the participants, as people were free to enter and leave the box at their convenience. Accordingly, a protocol was structured for the observation of the immersive experience (Annex 7) and a list of questions for interviewing the visitors to the Möbius box (Annex 8). In order to be ethically compliant with D1.3 "Ethical Requirements for Human Participation in Research", the following additional material was prepared: i) informed consents to be signed by the people voluntarily participating in the

interviews (Annex 9) and ii) a disclaimer to be visible in the venue in order to alert people about the presence of researchers carrying out participatory observation.

Möbius immersive experience

As already specified, the Immersive Experience was a more static experience since people were seated in the centre of the room and did not move much during the show; therefore, no observations regarding traffic in the venue were made. Researchers were stationed behind the participants and as a result it was not possible to observe facial expressions. However, people were interested and excited about the experience as it is highlighted by the fact that participants took videos and photographs during the show. The experience stimulated people's curiosity since after its end, they moved on to the MIBB where they could experience the same audio-visual input, in a smaller space, while also being able to move around. The audio-visual elements of the immersive show encouraged and allowed the participants to become immersed and involved in the experience. This was also indicated by the sounds among the audience during particularly surprising or suspenseful moments (e.g. sharks swimming along the walls) of the show. In general people found the experience stimulating and enjoyable. On the negative side, it became apparent that unless a person was seated in the middle of the room, it was more difficult to perceive the entire experience without having to turn their head around.

A similar positive experience was also glimpsed by reports from other consortium members who were able to participate in the Möbius immersive experience during the Leipzig event. They were positively surprised by the outcome and reflected that it exceeded their expectations.

Mobile Immersive Book Box

During the showcase of the Immersive Experiences in Leipzig in April 2023, the MIBB was still at a preliminary version. As already mentioned, the MIBB was set in a large room, where people could walk in and out of it freely. Images were projected on all four walls while music and sounds were broadcasted through speakers. Around 70-80 people entered the box, some of them having previously experienced the immersive show. People seem to belong to the middle class, with the majority of being between 30 and 50 years old. More women than men seem to have entered the box, while a lot of people were wearing glasses. While people were able to move in and out of the box freely, it was observed that people spent about 10 minutes in the box and left when the same visuals were replayed. This indicates that people were interested in following the projected experience in its entirety. The fact that even if people were able to walk out of the box at any point but chose not to and instead remained inside for the duration of the experiences, highlights the potential of the MIBB. While inside the box people did not move much; again, this indicates a deep interest in the audio-visual elements and the experience, as opposed to restlessness. There was not much interaction between people inside the box, especially when a lot of people were in; however, more interaction was observed when less people were inside the box. Some people, mostly women, took photographs and videos. In general, people displayed positive reactions and seemed to have been deeply immersed in the experience with the help of the audio-visual effects. As with the immersive experience, the audio-visual effects were described as enjoyable and stimulating.

Results of the impact assessment

The Leipzig event provided a first opportunity to test the Möbius immersive experiences and to assess their impact on the dimensions described above. This subsection presents the general feedback gathered on the immersive experiences and discusses the observed impact in an aggregated manner. The audio-visual effects of both outputs have been for the most part commented positively; they create a big impact which helps visitors to immerse themselves in the experience. The music received specific mention by the audience as one of the most important and positive aspects of the experience. While it was emphasised that this is a preliminary release, its potential was clear and there was encouragement by most people to keep working on it. However, it was pointed out that visitors who were not familiar with the books shown and the plot found the visual effects confusing and the general experience not entirely satisfactory, especially when compared with previous events shown at KKW. Indeed, as it has been observed also during the display of the MIBB at the Frankfurter Buchmesse (discussed below in Subsection 5.2) previous knowledge of the book shown or a short summary of the plot would enhance people's immersiveness in the show. The piloting that took place regarding the impact of the MIBB has also highlighted its potential success as a promotional tool which shows trailer-like immersive experiences centred on books.

The most important social impact of the Möbius outputs is the resulting change in reading habits. The participation in the Mobius experiences and the subsequent immersion in the storyline created curiosity about the showcased books; people felt like they became part of the story, felt a connection with the protagonists, and the desire to learn more about the plot. However, it should be emphasised that participants perceived this as a change that is more related to books that people view through these experiences rather than a general desire to read more books. Overall, the resulting change in reading habits reflects the specific stories that are showcased in the Möbius experiences.

While the Möbius experiences could potentially have an impact on elderly or disabled people, no relevant data were collected in the Leipzig event.

Regarding the technological impact, the showcased products can increase the fruition of the multimedia book experience as it is highlighted by the positive comments of the participants. The audio-visual effects helped people become immersed in the story and the overall experience was described as enjoyable. In addition, it was pointed out that these experiences with an emphasis on stimulating many senses, from seeing to listening, and the projection on screens, made this a project suitable for reaching different groups of people, including children and young adults: *"A lot of positive aspects because you can speak with a lot of people about such a project, with children, adults, young people because it's a computer simulated, but you can also hear, I think it's perfect because it touches all the senses".*

5.1.2 Bright Festival Connect

The second event for showcasing the Möbius Immersive Experiences took place during the fourth edition of the Bright Festival Connect in KKW, Leipzig, from the 12th to the 15th of October 2023. A Möbius Vernissage, offering an immersive and interactive reading experience of the novels *The Influence of Blue* and *Fantasy into Möbius*, took place on the 11th of October

at the Maschinenhalle. The audience consisted of 68 attendees, 25-60 years old, Moreover, from the 12th to the 15th of October, the MIBB - showing *The Influence of Blue* was set up outside the main venue and visitors had the opportunity to see it as the last stop of the tour through KKW's premises which started with a long show indoors. While an accurate estimate of the people who visited the MIBB is not available, it is likely that almost all of the 2655 visitors to the festival went outside to see it since it was part of the tour which was promoted by flyers and the webpage.

During this festival, it was decided to collect feedback only on the MIBB. KKW conducted their own survey, incorporating only a subset of the questions provided by DEN. Because the survey differs from the one used in other events collecting feedback on the impact of the MIBB, the results of this survey are presented separately.

The survey was filled by 49 people, belonging in their majority to the 21-30 age group, followed by the 31-40 and finally the 41-50 age groups. Slightly more male respondents answered the survey questions, compared to female participants. The majority of the respondents had at least a BA degree. The limited scope of the survey used allows us to comment only on two dimensions. Overall, there was a general satisfaction with the show in the MIBB, even if a quarter of the participants replied negatively. Similarly, the majority of people would recommend the show to others. The rate of satisfaction in experiencing the MIBB reflects a technological impact. More importantly, the results of the survey reflect the potential of the MIBB in having a social impact, and specifically an impact on behavioural change, measured in an increase in book consumption. While 42% of the respondents are ambivalent of whether such an experience adds value to reading a book, the same percentage agrees that such an experience can indeed encourage people to read the original, and an additional 39% is ambivalent in this respect. At the same time, 42% of the respondents would like to see more book adaptations of this type. It is argued then that even if such an immersive experience may not lead people to read more books in general, there seems to be a general desire to read the book that was shown in the experience. This view was also reflected in the interviews and observations during the first showcase of the immersive experiences at the Fantastic Adventure Night.

5.2 Showcasing the immersive experiences in other events

Piloting activities for the Möbius Immersive experiences (MIBB and VR headsets) took place during four different events (Figure 44); a total of 168 people responded to our surveys. The piloting was carried out by DEN, IMEC, ENoLL, MWB with assistance from FMWC and KKW.

Figure 44. Piloting activities and testers reached for the Möbius experimental productions

Outside of the KKW premises, the MIBB was tested only at the Frankfurter Buchmesse 2023 (because of high transportation costs). The Frankfurter Buchmesse is the largest book fair in Europe. It is an opportunity to access people who are experts in the publishing industry. During the days that the event is open to the public it is an opportunity to access a wide range of public, from younger people to stakeholders. The participation in the Buchmesse was in fact Part A of the closing event for the Mobius project. This was considered a good opportunity to showcase the immersive experiences, for the first-time outside Leipzig, where they were created. Regarding the set-up of the MIBB, it should be mentioned that a very short summary of *The Influence of Blue* was posted outside of the box. Both shows, *The Influence of Blue* and *Fantasy into Möbius*, were projected in the final version of the MIBB. People were able to move freely in and out of it, while some seating was provided inside the box. Images were projected on two walls (Figure 45).[4] Also, it should be noted that the fair was opened to the public on 20/10, attracting a large audience of young people. In addition to the 56 responses to our survey, many more attendees approached the Möbius booth and showed an interest in the project. In fact, many people briefly watched the show in the MIBB and did not participate in the survey (either they spent too little time, or they did not want to take the survey, or left from the second exit and thus did not have a conversation with the piloting partners). All these parameters should be considered when assessing the impact of the MIBB.

[4] Some technical problems were encountered at the beginning of the fair, which were fixed in the following days. The MIBB needed to be adapted to the conditions of the Frankfurter Buchmesse (more light and noise, a different environment from Leipzig). Thus, the experience was properly assessed from 20/10 onward.

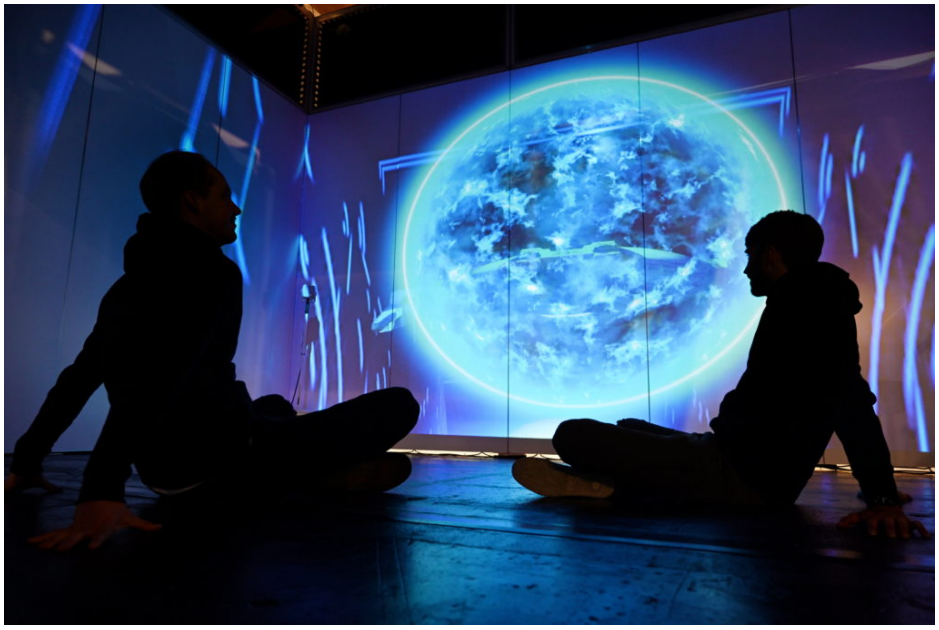

Figure 45. Mobile Immersive Book Box at the Frankfurter Buchmesse 2023 - Möbius / Picture Alliance / May Frank

The VR headsets were devised as a way to view the same shows projected in the MIBB, in an easily portable device with a more manageable cost. Following the instructions from KKW, the facilitators of the piloting activity set up the headsets and gave them to people to watch the show (Figure 46). The hand controllers were not used by the audience because the show was not interactive. Similarly to the MIBB, both shows were available to watch through the headsets.

Figure 46. Participants testing the VR headsets at the Frankfurter Buchmesse 2023. - Möbius / Picture Alliance / May Frank

The assessment that follows considers both outputs together and presents the outcomes in an aggregated manner, following a methodology reflecting the one adopted for the Player. Relevant impact areas, dimensions and indicators are shown below in Figure 47.

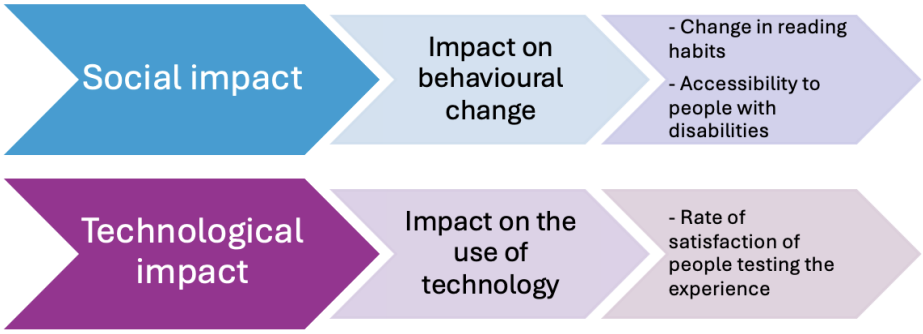

Figure 47. Relevant impact areas, dimensions, and indicators for the Möbius Immersive Productions

The majority of people (71.9%) who tested the experiences identify as readers, with a significantly smaller percentage identifying as artists and creatives (7.2%) or as experts in the publishing industry (9%). Considering that three out of the four events where the outputs were tested, were in fact book fairs, then the profile of the audience is not surprising. More women than men tested the experiences. Regarding the age groups of people that tested these two outputs, there is a difference between the audience attracted by the MIBB vs the one attracted by the VR headsets as it is shown in Figure 48. The VR headsets attracted the interest of a large audience, especially people in the 18-20 and 21-30 age groups. On the other hand, the audience that tested the MIBB fell into different age categories, i.e., the 21-30 group, followed by the 31-40 group. Overall, the audience that interacted with the Möbius outputs fell into the 18-20 (29%), the 21-30 (29%) and the 31-40 age group (22%); showing a willingness primarily among young people to test these products. Finally, 67% of them tested the VR headsets and 33% tested the MIBB, highlighting how a new and popular technology like the VR headsets has the potential to attract a large audience.

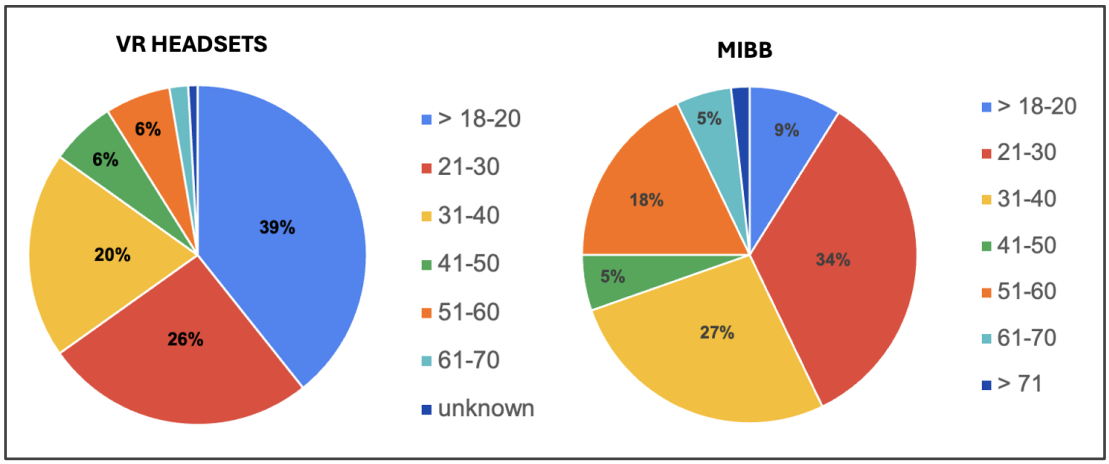

Figure 48. Age groups of the audience testing the VR headsets and the MIBB

Social impact: Impact on behavioural change

Impact on behavioural change considers changes in daily life routines, in the habitual uses of devices and the forms of social relations mediated by technology. For the case of the Immersive Experiences, two indicators were analysed: accessibility to older adults and/or people with disabilities and change in reading habits.

As shown in Figure 49, slightly more than 50% of the participants see the experiences as an added value to the traditional reading experience and as a way to promote reading among people with disabilities, reflecting the]social impact that can be promoted with these Möbius tools. Specifically, the first indicator, reflects an additional dimension of the impact on the use of technology through an increased understanding of the story through an immersive experience. This aspect may be particularly helpful for people with learning disabilities as it would facilitate their understanding of a story through an innovative and engaging mode.

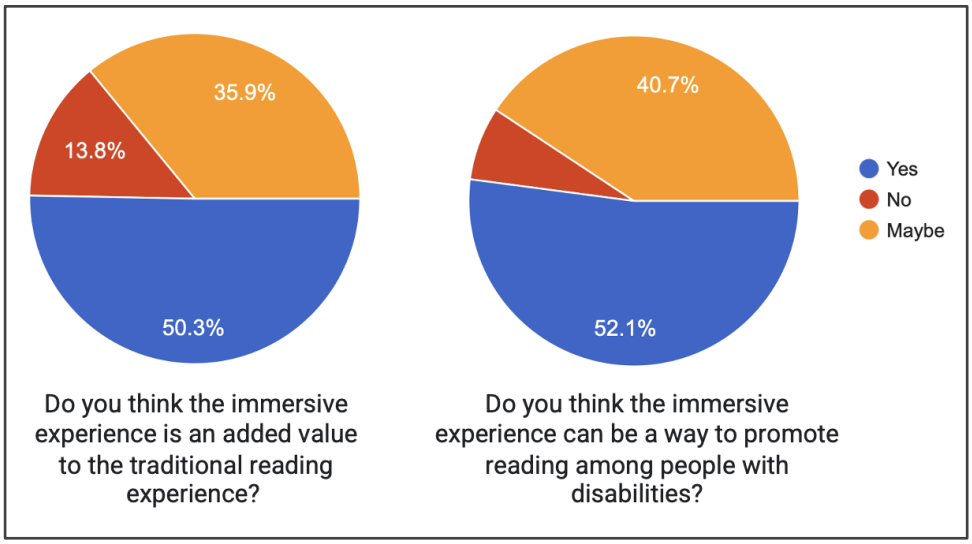

Figure 49. Pie charts with responses (167) in % to "Do you think the immersive experience is an added value to the traditional reading experience?" and "Do you think the immersive experience can be a way to promote reading among people with disabilities?"

More than half of the testers (56%) see a connection between the experiences and the desire to read more books in general (Figure 50) and an even bigger percentage (62%) would like to read the book shown in the experiences (Figure 51). This last indicator, in addition to highlighting a potential change in reading habits, also reflects an aspect of technological impact, namely the increase in the fruition of multimedia book experience and shows the potential of this innovative tool in promoting books and other content.

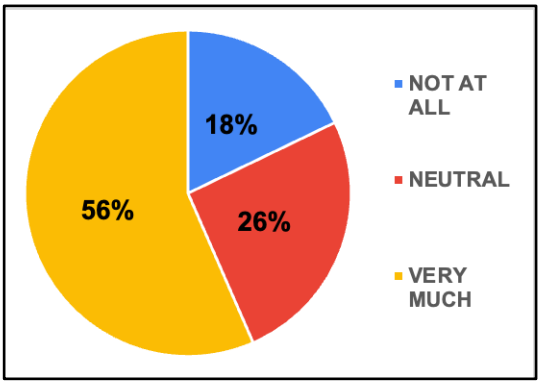

Figure 50. Pie chart with responses (168) in % to the question: "Do you think the Möbius immersive experience can stimulate the desire to read books in general?"

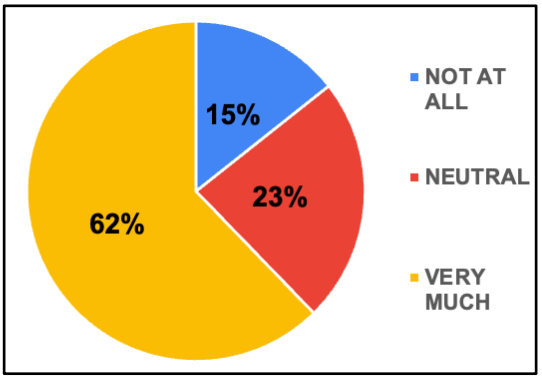

Figure 51. Pie chart with responses (167) in % to the question "Do you think the Möbius immersive experience can stimulate the desire to read the book you explored during the experience?"

Related to this dimension, is the positive response of testers (67.3%) in wanting to experience more books through an immersive experience (Figure 52). On the one hand this reflects how such experiences can lead to changes in reading habits, increasing the consumption of books and, on the other hand, highlights the fruition of the multimedia book experience.

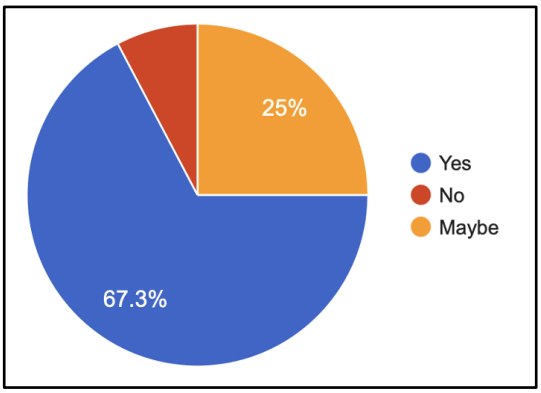

Figure 52. Pie chart with responses (168) in % to the questions "Would you like to experience other books through an immersive experience?"

Technological impact: Impact on the use of technology

The first dimension used to measure the impact on the use of technology is an overall rate of satisfaction, shown in Figure 53. 67.6% of the respondents give a highly positive rate to the experience, reflecting the potential success of the output. This overall positive reception of the immersive experiences and the impact on the use of technology are supported by the fact that 70.3% of the respondents say that they highly enjoyed the experience (Figure 54) and 74.5% would recommend it to others (Figure 55).

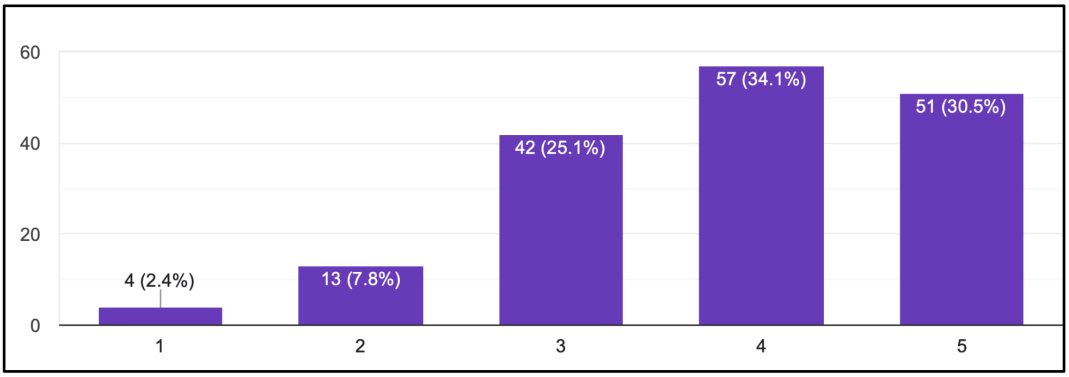

Figure 53. Responses (167) to the questions "How satisfied are you from the Möbius immersive experience on a scale from 1 to 5?" (1 equals "not at all" and 5 equals "very much")

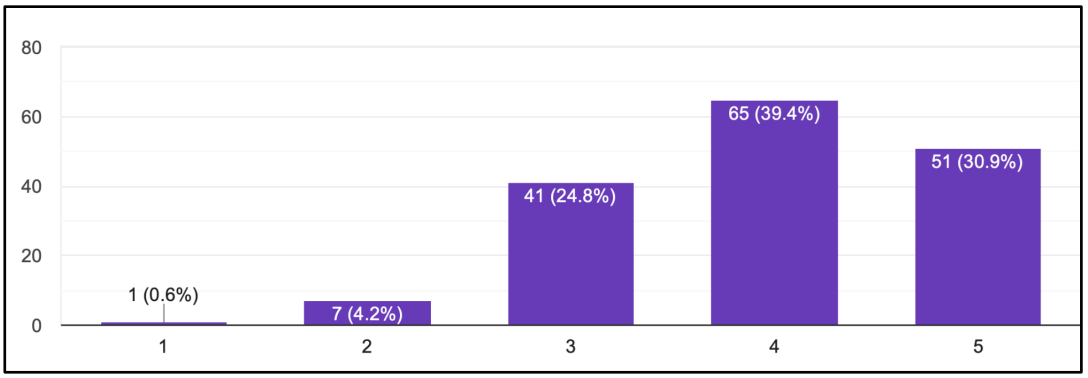

Figure 54. Responses (165) to the question "How would you rate your overall enjoyment of the immersive experience?" (1 equals "not at all" and 5 equals "very much")

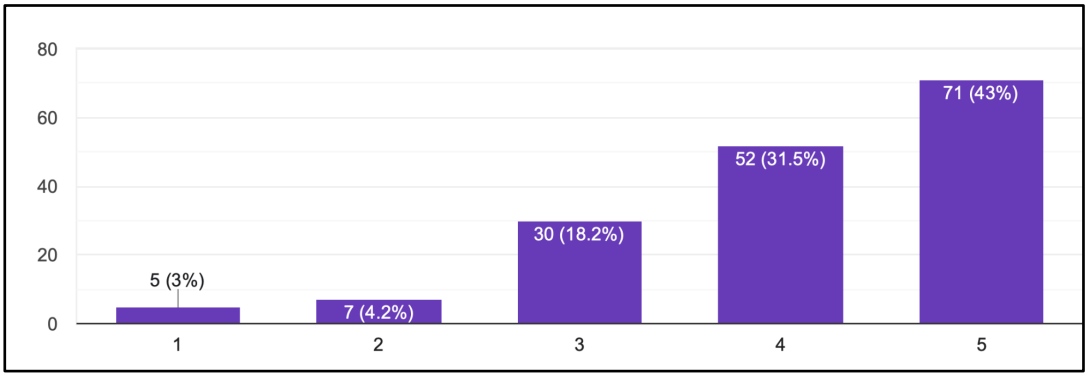

Figure 55. Responses (165) to questions "Would you recommend this immersive experience to others?" (1 equals "not at all" and 5 equals "very much")

The impact on the use of technology and, specifically, the increase in the fruition of the multimedia book experience was also targeted with three additional questions. As shown on Figure 56, the majority of the participants noted that the experiences were able to capture and hold their attention (65.2%) (4 and 5 on a Likert scale 1-5) with 25.7% of the responses falling in the middle (3 on a Likert scale 1-5).

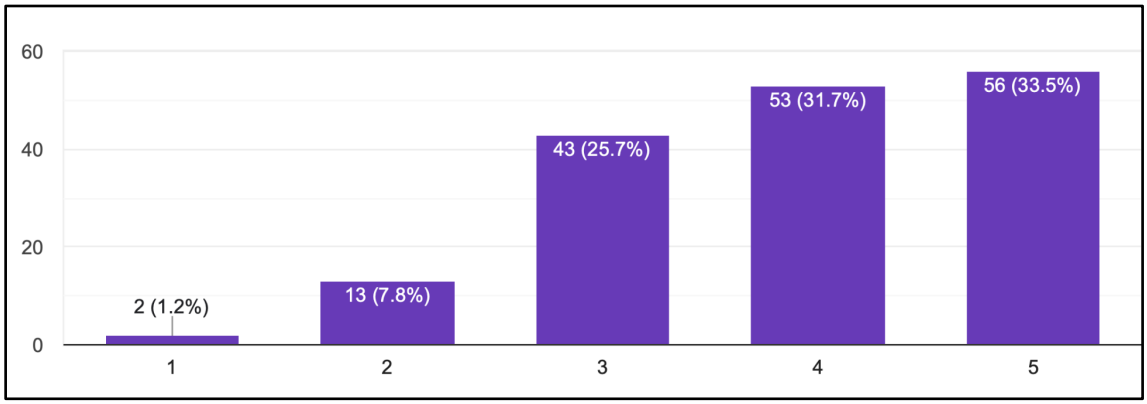

Figure 56. Responses (167) to the questions "To what extent did the experience capture and hold your attention?" (1 equals "not at all" and 5 equals "very much")

On the question whether the participants felt actively involved in the experience, the majority of the responses (45.2%) were positive; however, there was also a significant percentage of "maybe" (32.7) (Figure 57).

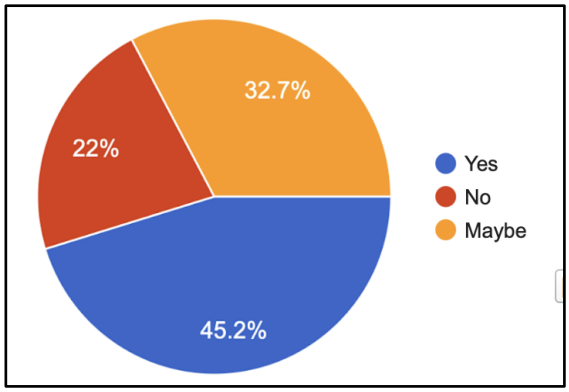

Figure 57. Responses to the question "Did you feel actively involved and engaged in the immersive experience?"

In terms of the aspect of the immersive experience that impressed the participants the most, the images were highlighted with 36.1%, followed by the overall components together with 33.7% (Figure 58). It is interesting to note that the sound and the story were commented on by fewer respondents (almost 9.6% and 1.8% respectively).

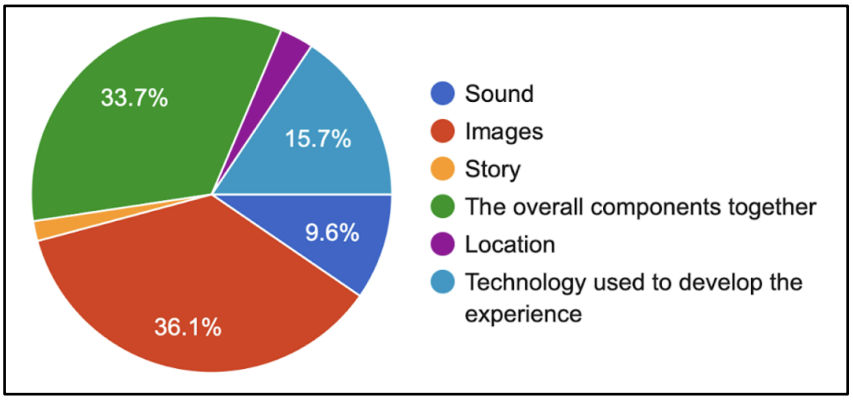

Figure 58. Pie chart with responses (166) in % to the questions "Which aspect of the immersive experience impressed you the most?"

A final aspect to note is the overall positive perception that the immersive experiences can have in stimulating the curiosity and creativity of the participants with 62.2% (4 and 5 on a Likert scale 1-5) and 26% in the middle (3 on a Likert scale 1-5) (Figure 59).

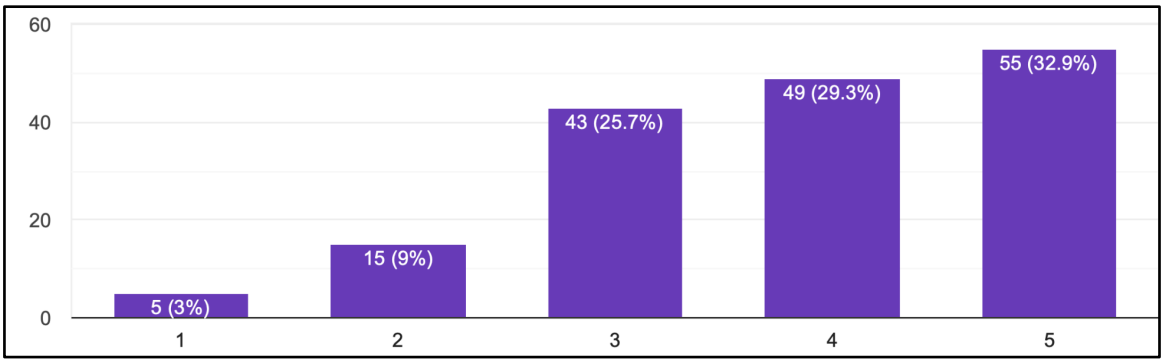

Figure 59. Responses (167) to the question "To what extent did the immersive experience stimulate your curiosity or creativity?"(1 equals “not at all” and 5 equals “very much”)

6. Results of the Möbius general evaluation

As mentioned in D2.1 "Möbius theoretical framework: opportunities, benefits, and risks", the Living Lab methodology was used within the Möbius project. This ensured iterative development and testing of the developed Möbius products. The most important aspect of this process is the close alignment with the technology development process through various feedback loops. This ensured that feedback from users was included in the different development phases. Thus, the challenges and lessons learned from each Pilot Phase guided the next. The results from the three Pilot Phases for the general user evaluation are discussed below.

Pilot Phase 1

During PP1, mainly co-creation sessions were organised for the Möbius Creator, Möbius Player, and the Möbius PIT, focusing on content creation practices, user experiences, and data management in the publishing industry. For the Möbius Creator, discussions revealed differences between prosumer and professional writers' approaches to content creation, with insights into story development and writing tools for preferences. Feedback on 3D audio clips highlighted appreciation for immersive experiences but also suggested improvements for better control and variety. In the sessions organised for the Möbius Player, reading habits were discussed, emphasising preferences for digital reading due to portability and accessibility, with concerns about the loss of social aspects in digital reading. Feedback on 3D audio clips and Player mock-ups emphasised the importance of narrator voice variety, synchronisation, and ease of use. The Möbius PIT sessions focused on current publishing practices, data needs, and potential business models. Publishers expressed the need for comprehensive market insights, including consumer behaviour and genre-specific data. Discussions also covered the relevance of online communities' data, challenges in accessing digital consumption data, and interest in innovative revenue models. Overall, the discussions shed light on the evolving landscape of content creation, user preferences, and data-driven decision-making in the publishing industry, with valuable insights and user requirements gathered for further development and improvement of Möbius applications.

Pilot Phase 2

During PP2, feedback on the Möbius applications were collected through surveys and interviews. For the Creator, user feedback focused on usability, user experience, multimedia content integration, 3D audio, and the production process. Generally, participants found the Creator enjoyable, but identified areas for improvement, such as intuitiveness, ease of use, terminology consistency, and multimedia content integration. In terms of book creation, users expressed difficulties with creating chapters and integrating different types of files (text, audio, CTA-links), also suggesting improvements for richer text editing options and easier integrations of audio files. For the 3D audio integration, users had mixed opinions, with some finding it interesting while others found it distracting, suggesting improvements such as better control over audio tracks and content variation. In the production process section of the survey, it was highlighted that the Creator did not significantly improve users' digital- or writing skills, nor did it save time or costs. Users were unsure about its added value for cross-media production. For the Player, mixed opinions on various features, with some contradictions, were observed.

Users provided in-depth feedback on what they liked or disliked, emphasising expectations for added features, content presentation, and usability improvements. In terms of the 3D audio integration and multimedia content redirection, both positive and negative feedback was received, with suggestions for better control and continuous audio playback. User interface and user experience improvements were also suggested, e.g., adding a back button and enhancing readability. For the PIT, feedback on the interpretation of graphs and icons revealed confusion among participants regarding data collection, representation, and usefulness. Suggestions for improvement included clearer explanations, additional features, and more comprehensive data analysis options. Overall, the analysis identified various areas for improvement in both the Creator and Player apps, as well as in the PIT, with users providing valuable feedback on usability, user experience, and feature enhancements. Again, these were incorporated in (updated) user requirements that guided the further development of the application toward PP3.

Pilot Phase 3

During PP3, workshops, surveys, and interviews were organised to receive feedback on the Möbius applications. Regarding the Creator, users expressed enthusiasm for its concept of creating immersive stories with multimedia content and its utility as a self-publishing tool. However, criticisms were directed at its complexity, particularly in adding content and chapters, and its simplistic UI/UX design. Users also highlighted concerns about the lack of a mobile app, and raised questions about legal/privacy issues, suggesting the need for simplification, enhanced design, tutorials, and addressing privacy concerns. In the case of the Player, users appreciated the inclusion of multimedia elements and interactivity like comments and bookmarks. However, they found the app non-intuitive, especially regarding audio control and layout, and lamented the lack of offline functionality and personalization options. Suggestions for improvement included enhancing audio control, layout, personalization options, and providing offline functionality. Feedback on the PIT indicated that users found it user-friendly and appreciated its data segmentation. However, they desired more language options, useful statistics, integration of additional data sources, and improved customization. Suggestions for enhancement encompassed adding language options, integrating more relevant data sources, improving statistics, and enhancing customization. Overall insights underscored publishers' interest in user data for understanding reader sentiment and forecasting sales trends. However, concerns were raised about data source relevance, accessibility, and costs, particularly in smaller markets. The PIT was seen as potentially valuable, but it faced barriers to the implementation due to these concerns. Suggestions included the need for diverse datasets, nuanced content insights, and regional market analysis. Integration into business models was viewed as beneficial if data aligned with publisher interests. In conclusion, while the Creator, Player, and PIT received all positive feedback for their concepts/ideas, numerous areas for improvement were identified, including simplification, enhanced features, and addressing user concerns such as privacy and data relevance. The PIT, in particular, had potential but required addressing concerns about data sources and customisation, to achieve widespread adoption by publishers.

7. Results of the Möbius impact assessment

The impact assessment of the Möbius outputs followed the methodology established in D2.3 and submitted on M15 of the project. The Möbius IAF considered four areas of impact: social, economic, environmental, and technological. Each impact area was further elaborated with dimensions and indicators. Not all impact areas have emerged as relevant for the assessment of the Möbius outputs. Therefore, in the discussion that follows, the focus is on the social, economic, and technological impact and the most relevant dimensions that have emerged in our data collection and analysis.

The Möbius outputs that were assessed are the following: Möbius Creator, Möbius Player, the Möbius PIT, the Möbius Immersive Experience, the MIBB and the VR Headsets. As the outputs are different and target different users, our assessment has focused on diverse stakeholders including professional end users, publishers, readers, prosumers, writers, and self-publishers.

The plan for the impact assessment of the Möbius outputs follows the three Pilot Phases described in the DOA: PP1 running form M9 to M12; PP2 running from M13 to M18; PP3a running from M19 to M30 and PP3b running from M31 to M36. PP3a consists of collecting data on the user requirements and impact assessment of the Möbius outputs, while PP3b mostly consists of demonstration of the Möbius experiences at different events. It is important to emphasise that all the work has been conducted in a collaborative and iterative way in the sense that each assessment per Pilot Phase has been a way to provide suggestions to technical partners for further implementation. Certainly, the third and last Pilot Phase (PP3) is the one where most of the impact assessment has been possible as outputs had reached a near-to-final version.

In the presentation of the general findings below, it should be kept in mind that the Möbius outputs were assessed at three different points in their development. Thus, the changes in relevant dimensions and indicators reflects the iterative nature of the methodology. Table 33 below presents the impact areas and dimensions that have emerged as most relevant, per Möbius output.

Impact area	Impact dimension	Möbius output
Social impact	Impact on social inclusion	Möbius outputs
		Player
		Immersive experiences
	Impact on behavioural change	Möbius outputs
		Player
	Impact on education	Creator
	Impact on knowledge production	PIT
Economic impact	Impact on cost reduction	Creator
	Impact on production process	Creator

Technological impact	Impact on data usage	PIT
	Impact on the use of technology	Creator
		Player
		Immersive Experiences

Table 33. Relevant impact areas and dimensions per Möbius output

7.1 Social impact

Impact on social Inclusion

Impact on social inclusion has been emphasised already from PP1 in the co-creation process of prototypes for the Möbius outputs, not only in the engagement of specific groups of people as end-users but also as legitimate participants in the co-creation activities. Therefore, the Möbius project is expected to promote social inclusion for marginal groups, extending the target of potential consumers/prosumers and reducing the knowledge gap. In fact, the Möbius Player, and the Immersive Experiences with a range of innovative tools that enhance the reading experience could enlarge the common perception of book reading to include people with disabilities (physical and learning) that find such an activity exclusionary and difficult. This aspect is discussed further below. An additional aspect of social inclusion that was brought up in PP1 but was explored in detail in the subsequent Pilot Phases concerns the "learning effect" of languages through audiobooks.

Impact on behavioural change

The Möbius outputs are expected to have an impact on behavioural change, visible through different indicators.

During the evaluation of the Möbius Player in PP2, a generational gap was detected regarding the approach to the device: "[it's] for young people, this is their world". The difficulties encountered by the older end-users may reflect a potential risk of increasing the digital divide between young people and adults. In addition, there is the perception that using digital devices for reading causes stimulus and media overload instead of allowing space for one's own imagination and fantasy. While the issue of the generational gap did not come up in the subsequent Pilot Phases, the issue of media overload and the use of imagination while reading remained valid.

Already from PP1, in the discussion of the Möbius Player, a potential social effect related to the dimension of behavioural change has been emphasised: the accessibility to older adults and people with disabilities. This dimension was explored further in PP3 both for the Möbius Player and Immersive Experiences. Some testers reported that the coexistence of various sounds, either ambient sounds, narrator or music were distracting. The combination of all three different audio tracks may hinder the experience of reading a book and this could potentially create additional problems for people with disabilities. Insights such as these on the Möbius Player during PP3 highlights an opportunity for further research as indeed little is known about

the specifics of why and when a soundtrack (dramatic, ambient or narration is considered distracting as opposed to immersive.[5]

Looking specifically at the assessment of the Immersive Experiences, more than 50% of the testers see the experiences as an added value to the traditional reading experience and as a way to promote reading among people with disabilities, reflecting the social impact that can be promoted with these tools. Specifically, testers emphasise how the immersive experience allows them to have an increased understanding of the story. This aspect may be particularly helpful for people with learning disabilities as it would facilitate their understanding of a story through an innovative and engaging mode.

It should be clarified here that the Möbius outputs were not tested with disabled users; yet there is potential for the tools to help improve accessibility to reading materials for these vulnerable groups, but it has not been validated on actual users during the lifetime of the project.

Looking now at the impact on book consumption, this dimension has been explored through a change in reading habits and an increase in book consumption. The data collected presents an ambivalent situation and a rather negative association of the Möbius Player with an increase in book consumption. On the contrary, the assessment of the Immersive Experiences has shown that more than half of the testers (56%) see a connection between the experiences and the desire to read more books in general and an even bigger percentage (62%) would like to read the book shown in the experiences. This last indicator, in addition to highlighting a potential change in reading habits, also reflects an aspect of technological impact, namely the increase in the fruition of multimedia book experience and shows the potential of this innovative tool in promoting books and other content.

Impact on education

The potential impact of the Möbius outputs and in particular of the Möbius Creator on education is related to potential improvements in writing and digital skills for authors and content creators. Due to digital innovation, devices and digital tools allow writers and prosumers to modify their workflow in two ways. First, by producing new content in a more flexible way, e.g. creating content on the move, or changing places of work and second, by using a cross-media approach in the design of the outcome. Considering the potential effect of the output on this point, an important aspect is the actual configuration of the creation process. The participants showed a quite traditional way of organising their workflow, using analogical tools and word processing software, and avoiding or ignoring the possibility to update their habits toward innovative solutions.

The dimension of an increase in writing and digital skills for authors and content creators was explored further in PP2 and PP3. According to the results collected during PP2, the Möbius Creator is not expected to significantly improve digital and writing skills. However, the positive value assigned to writing skills is higher than the one assigned to digital skills; this led to the initial hypothesis that the Möbius Creator could have an effect on the development of writing skills rather than on the use of devices and software. However, the data analysis during PP3

[5] Jennes *et al.* 2023.

indicates a negative association between the use of the Creator toolkit and the improvement of the writing skills of authors. Despite expectations that emerged in PP2 that the use of the Creator toolkit would have a greater impact on the writing skills of authors, the assessment of this aspect of the toolkit by potential users leans towards the negative side.

Impact on knowledge production

During the testing of the PIT in PP2 publishers regarded in a positive way the possibility to collect information directly by prosumers as this could help with the prediction of future trends based on the actual readers' habits and taste.

7.2 Economic impact

Impact on cost reduction

Impact on cost reduction was explored from the perspective of the Möbius Creator over the duration of the three Pilot Phases. During PP1, discussion focused on the audiobooks; where editors and writers saw a potential decrease in money and time costs with the involvement of prosumers in the creation of audiobooks, by-passing professional and expensive narrators. The engagement of the community of readers could also reduce the cost of promotional activities on social media. The overall Möbius infrastructure is also expected to have a potential impact on access to data (sales, trends, and readers' tastes) which is a key feature for publishers, reducing its cost, by-passing large and quasi-monopolistic companies in the sector.

During PP2 and PP3, the perception of cost reduction in relation to the use of the Creator emerged as less relevant. In fact, while initially testers expected more in monetary savings rather than in time reduction, the data collected in PP3 showed that the confidence in the potential of the Creator toolkit to have an impact on cost reduction is low.

Impact on production process

The impact on production processes was investigated in relation to the Creator only during PP3 and was analysed through three indicators: changes in production practices due to stakeholder use of the tool; easy promotion of contents and increased collaborations on cross-media productions. Regarding the first two indicators, the responses received span the entire spectrum, showing ambivalence in the perception of the potential impact of the tool in this respect. However, a positive association has been observed in the use of the Creator and the stimulation of new cross-media collaborations.

7.3 Technological impact

Impact on Data Usage

The impact on data usage has emerged as relevant only in relation to the PIT. Thanks to the PIT, the Möbius project is expected to have a positive impact on data collection/sharing practices to overcome the current distortion of the market and to reduce knowledge gaps between all the actors involved in the field: writers/prosumers, publishers, and readers/consumers.

Impact on the use of technology

Overall, the Möbius outputs (Creator, Player, and Immersive Experiences) are expected to have an impact on the use of technology; this dimension was explored through diverse indicators. In the discussion on the Möbius outputs, the potential "boomerang" effects caused by cross-media overload has been brought up. The Möbius project is expected to enlarge and propose an immersive experience but also to leave the end-user the possibility to have an intimate experience, not contaminated by other media productions.

Regarding the Möbius Creator, the dimension of impact on the use of technology has been analysed by evaluating the rate of satisfaction and the usability of the tool. Already from PP2, the usability of the Creator was not perceived as effective, efficient, and fully satisfactory. A slight change was observed in PP3, with the overall rate of the Creator being neutral to positive. However, in assessing this indicator in a more detailed manner, it is observed that the general perception is rather negative, and users would not want to use the tool frequently or recommend it to others. In terms of usability of the Creator toolkit, the responses collected are somewhat contrasting. While the evaluation of certain features such as creating a book or a chapter is positive, users would refrain from using these features. It should be emphasised here that these tasks relate to more traditional aspects of book writing. It is possible that authors do not feel that such a tool would particularly help these tasks. This notion can be related to the perception of the improvement of the writing skills of authors, discussed above as a potential social impact from the use of the Creator. It seems likely that users do not expect improvements in traditional skills of book writing with the Creator. A slightly different image is portrayed from the assessment of usability and willingness to use the 3D audio creator; the more ambivalent nature of the responses in this case may be related to the fact that this is a technological feature of the toolkit.

Already from PP1, the Möbius Player has been judged positively in increasing the understanding of the story, especially through immersive audio. However, the individual nature of the reading experience was also stressed, highlighting the active role of the reader in constructing and imagining the scenes, the atmosphere, the sounds, and the music. The most critical components are the use of footage, music, and other material from the movie version of a book. Perceived as "embellishing the writing", it can be a boomerang, reducing the reader in a passive and consummatory role. The overall rating of the Player is positive over the three Pilot Phases. However, slight changes in the components that are considered more valuable were observed. In PP2, the value of the immersive experience does not lie primarily in the immersive audio, but rather in other features such as text and images. In PP3, the overall positive ratings for the usability of the emphasise the role of the 3D audio in helping users understand and immerse themselves in the story.

It should be emphasised here that a significant percentage (34%) of testers during PP3 highlighted the fact that 3D hinders their focus when reading. This should be read together with comments on related issues: the video distracted from the story, it was hard to concentrate with reading and listening at the same time, the sounds were not precisely aligned with the text and this created issues in reading and listening, the audio was distracting, there was an overwhelming amount of acoustic and visual information, low quality of the 3D audio, the way that the 3D audio was played (using different channels) was confusing and distracting,

annoying voice of the narrator. It is interesting to point out the following comment: "I think audio distracts me from my own imagination of the story, and also if the narrator doesn't fit your preference of a reader, it's more likely to distract you than help you" which highlights that personal preferences are very important in rating such tools and the role of imagination in reading, an element that was also brought up in the PP1 and PP2.

Finally, it is observed that the technological impact of the Möbius Player is more relevant than the social impact. This is indicated by the positive responses in the overall rating of the tool and its usability. Negative reactions were reported on the quality of the 3D audio and on the coexistence of its different components. A certain ambivalence was noted regarding the social impact of the Player. Testers are not certain on whether the use of the Möbius Player will lead to an increase in book consumption. As it was already brought up in the discussion of PP2, some users bring up the issue that the presence of images and videos does not allow the imagination of people to work, which is for many a fundamental aspect in book reading.

Regarding the Immersive experiences, they are overall perceived in a positive way. The impact on the use of technology is supported by the fact that 70.3% of the respondents say that they highly enjoyed the experiences and 74.5% would recommend them to others.

8. Conclusions

8.1 Final remarks

The user evaluation and the impact assessment of the Möbius outputs were carried out in parallel during the lifetime of the project and under the framework of the three Pilot Phases. Each process evaluated and assessed the Möbius outputs with the goal of providing a comprehensive understanding from the perspective of the users, both as active participants in the development of these tools and as the end-users/ customers/ prosumers who will observe an impact through the use of the Möbius outputs.

Despite the fact that the two types of surveys employed were very different (open vs closed ended questions) and encouraged different types of feedback (qualitative vs quantitative) from the participants, a summary of the evaluation and assessment of every output is provided here below, focusing on the results of PP3, when the outputs had reached their final version within the timeframe of the Möbius project.

Möbius Creator

The Möbius Creator, a tool that allows professional and amateur writers, as well as content creators to write and compile books incorporating 3D audio and media, and to create immersive stories, was regarded with enthusiasm by its potential users, especially for its perspective as a self-publishing tool. However, criticisms were raised regarding its complexity, particularly in adding content and chapters, and its simplistic UI/UX design. This perception is in line with the results of the impact assessment, highlighting the hesitance of potential users in making frequent use of the features of the toolkit. Furthermore, the fact that potential users do not really foresee an impact from the use of the Creator, neither in terms of education, nor in cost reduction, or in the use of technology, presents an issue for the future of the tool as it is at this stage. Nonetheless, it is worth emphasising that tasks that are related to more traditional aspects of book writing would not be easily substituted by digital methods of production, something that reflects the overall traditional character of the book and publishing sector.

Möbius Player

The Möbius Player is an application designed primarily for the consumption of the books generated on the Möbius Creator. The Player offers the opportunity of an enhanced reading experience, with 3D audio, images, and video. The users who tested the Player during the Pilot Phases enjoyed the inclusion of multimedia and interactive elements, like comments and bookmarks; however, they found the app non-intuitive, especially regarding audio control and layout. The impact assessment survey of the Player also highlighted similar problematic issues around the quality and control of the 3D audio elements, as well as the potential of the Player in creating accessible reading experiences to older adults or people with disabilities. At this stage of development, while the potential of the tool in this respect was recognised, users brought up issues, such as media overstimulation and distraction from the coexistence of multiple audio elements, which would have the opposite effect indeed. It should be clarified

here that the Möbius tools were not tested with disabled users; yet there is potential for the tools to help improve accessibility to reading materials for these vulnerable groups, but this aspect has not been validated on actual users. The social impact of the Player does not seem to extend to a change in reading habits; in fact, the data collected presents an ambivalent situation and a rather negative association of the Möbius Player with an increase in book consumption.

Möbius PIT
In PP3, useful feedback for the PIT was gathered via the user requirements surveys, workshop, and interviews. The feedback revealed that users found the tool to be straightforward, and that they appreciated the way the data was sorted. They wanted more language choices, more useful info, the integration of more data sources, and more personalization options. Adding language options, integrating more relevant data sources, enhancing statistics, and personalising are some suggestions for improvement. The general findings emphasised the publishers' fascination with user information for assessing reader opinions and forecasting sales trends. However, a number of issues have been identified regarding the adequacy, accessibility, and financial implications of the data sources. Data alignment with publishers' interests was considered useful for integration into business models. The PIT still faces the issue of publishers not being interested in fan fiction/community data, which is also the reason why, despite numerous attempts to reach out to them, few responses were able to be gathered.

Immersive Experiences
The Möbius Immersive Experiences, and especially the MIBB and VR headsets with the important feature of being transportable/portable and relatively low cost, allow users to fully immerse themselves in a story. The VR headsets, in particular, attracted the interest of a large audience, mostly young people, and stimulated their curiosity and interest not only in the story but also in the project itself. An important feature of the immersive experiences, as it emerged from the impact assessment activities, is the value that it adds to the traditional reading experience and the promotion of reading among people with disabilities. Along this line, and in contrast to data collected for the Möbius Player, users see a connection between the experiences and the desire to read the book enjoyed through the experience and more books in general. This can lead to a change in reading habits, and it highlights the potential of this tool in promoting books and other content.

8.2 Lessons learned and recommendations

As already discussed in Subsection 4.1, data collection for PP3 differed from the previous Pilot Phases, because (i) products were tested in a near-to-final version, incorporating the user evaluation and impact assessment feedback received from the previous Pilot Phases and (ii) regarding the impact assessment, instead of interviews, surveys were used, which provided for the most part quantitative data. For the case of the Möbius Player, Möbius Creator, and the Möbius Experiences the methodology presented in D2.3, as it was modified along the three Pilot Phases to capture properly the needs of every phase, proved to be successful as it allowed DEN and IMEC to collect data fast and uniformly. The issues encountered regarding data collection for the PIT should be attributed to the relevance of data presented in the

dashboard, the difficulty in reaching publishers, and the potential of attracting the interest of publishers during busy events, rather than to the methodology used for testing.

The fact that piloting took place in many countries was certainly an advantage in the assessment and evaluation of the Möbius outputs as it ensured a wide and diverse sample of testers. However, certain issues were encountered in using surveys in the English language. In order to overcome this, it was necessary in some cases, e.g. piloting activities in Poland, to translate the surveys and the results and then to manually merge the results, requiring the dedication of a significant amount of time.

Coordination and alignment among partners, even though overall positive, proved at times challenging. The administration of two different types of surveys (user requirements survey and impact assessment survey) simultaneously at events and the tracking of data created confusion. In addition, as it has also been reported in D5.3 "Möbius Open Piloting" there was participation fatigue, and it was often difficult to ask participants to fill in two different surveys. However, it should be emphasised that regular communication among partners and the ability to be flexible and adaptive has led to the successful piloting of the outputs and the collection of data that exceeded the KPIs mentioned in the DoA.

Furthermore, not all dimensions and indicators that were specified in the IAF (D2.3), and then later targeted as priorities for PP3, were analysed. In addition, dimensions and indicators did not emerge as relevant in a uniform way along the three Pilot Phases. This should be attributed to the different stages of technological development of the outputs at the time of piloting, from input for the co-creation of outputs to near-to-final products.

It should also be mentioned that, during some of the piloting events, technical issues were encountered, especially related to the immersive experiences, i.e. the MIBB and the VR headsets. While these were eventually overcome and the piloting was conducted in a successful way, it became obvious the necessity of on-site technical support from KKW, the partner responsible for the development of the immersive experiences.

The user friendliness, design, and interface turned out to be insufficient for users' expectations. In the future, and especially in like-minded projects, more emphasis should be placed on the development of these aspects of the technologies, and on better communicating the market-readiness level of the given technology. The aspects of exploitation and sustainability of the Möbius applications are further elaborated in D6.4 "Maximising impact report".

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Annex 1: User requirements survey

Questions	Response options
Feedback on which application?	• Player • Creator • PIT
What is your first impression of the app?	Free response option
What do you like about the app?	Free response option
What do you dislike about the app?	Free response option
Do you see potential in this app? Why (not)	Free response option
Do you see some thresholds holding you back from using this app in the future?	Free response option
What would you change about the app?	Free response option
Extra for PIT: How would our new technology fit into your current workflow or business processes?	Free response option
Extra for PIT: What impact do you anticipate the PIT having on your business model in terms of market positioning, competitive advantage, and customer satisfaction?	Free response option
Extra for PIT: What resources and capabilities would you need to successfully integrate and utilise the PIT within your business model?	Free response option
Age (group)	• 18-30 • 31-43 • 44-56 • 57-69 • >70 • Prefer not to say
Gender	• Man • Woman • X • Prefer not to say
Job	Free response option
Email address: * You are not required to give your email address. * Email addresses will only be used for research activities within the Möbius project. * Email addresses will not be shared with third parties. * Email addresses will not be used in any other communication. * You can always ask to remove contact information via elias.blanckaert@vub.be	Free response option

Annex 2: Interview questions for PIT

Opening questions
1. Before I start presenting the Prosumer Intelligence Toolkit, could you tell me a bit about your professional role in (Publisher company's name)? 2. Are you currently using any insights based on data from reading communities (such as Facebook groups, TikTok posts or fan fiction) in your daily practices?
PIT presentation, explaining the PIT
Introduction questions
3. What are your first impressions of the tool? 4. How well does the PIT align with your needs, for example after having integrated your own data? a. (If aligned with expectations and needs): What functionalities or experiences stood out? b. (If not aligned with expectations and needs): What are some improvements that would address potential shortcomings? 5. What resources and capabilities would you need to successfully integrate and utilise the PIT within your business model? 6. Are there any functionalities of the tool that you wish would be different or enhanced? 7. How frequently would you envision using the PIT in daily or professional activities? a. What factors do you think influence your desire to use it less or more often?
Transition questions
8. What features of the PIT would you say are user-friendly? a. Why? 9. What examples of areas or features of the PIT would you say could be improved in terms of user-friendliness? 10. What did you think about the way the data was presented in the dashboard? a. In what ways do you think the layout of the dashboard could be modified to better suit different user preferences or roles within your team/organisation? (i.e. what could be improved) 11. What needs to be improved to enhance the dashboard's usability to you? a. In what ways do you think the presentation of the data could be modified to better suit different user preferences or roles within your team/organisation? 12. Which specific elements or functionalities of the dashboard would you utilise? a. Are there any additional functionalities or features that you wish the dashboard offered?
Key questions
13. How useful do you perceive the data presented in the PIT to be? a. How do you think insights provided by the PIT could contribute to your strategy? 14. Do you think that the PIT could improve or contribute to understanding readers' behaviours? a. Do you think that the PIT can help you spot market trends? In what ways/why? 15. Can you envision scenarios in which the PIT could potentially create new revenue streams or contribute to cost savings within your existing business model? a. Why/why not? What specific areas of opportunities come to mind?

16. What impact do you anticipate the PIT having on your business model in terms of market positioning, competitive advantage, and customer satisfaction?
Concluding questions
17. Would you recommend the PIT to someone else? If so, what key aspects would be highlighted in your recommendation? a. (IF NOT) Why? 18. Before we conclude this interview, is there something about your experience using the PIT that we have not yet had a chance to discuss?

Annex 3: Impact assessment survey for the Möbius Book Creator (+ Hotjar survey)

Impact assessment of the **Möbius Book Creator**

Dear participant,

thank you for the time you are dedicating to the survey.

The aim of the survey is to collect your opinion and feedback on the Möbius Book Creator you tested already.
Feel free to express your honest opinion.
The survey won't collect any personal data and won't collect your email address.
The survey will take around 8 minutes.

In case of any doubts you can refer to the principal investigator of the research, Simona De Rosa at s.derosa@den-institute.org

By answering this questionnaire, you express your consent to the processing of the data you will share. According to the EU Regulation 2016/679 (GDPR) we inform you that the data will be processed by DEN Institute, and only for scientific research purposes.
The questionnaire is completely anonymous and DEN will in no way be able to link the information you share with you.
The answers generated by this questionnaire will be stored on DEN computers.
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Not shared

1. In general, how do you rate the Möbius Book Creator on a scale from 1 to 5?

	1	2	3	4	5	
Very poor	○	○	○	○	○	Very good

2. I would recommend the Möbius Book Creator to a friend/family member/colleague.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

3. The Möbius Book Creator works the way I want it to work.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

4. I would like to use the Möbius Book Creator frequently.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

5. In terms of ease of use, how do you rate the Möbius Book Creator?

	1	2	3	4	5	
Very poor	○	○	○	○	○	Very good

6. Creating a book using the Möbius Book Creator is easy.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

7. I would like to create more books in the future using the Möbius Book Creator.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

8. Creating a chapter using the Möbius Book Creator is easy.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

9. I would like to create more chapters in the future using the Möbius Book Creator.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

10. The 3D audio creator is easy to use.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

11. I would like to use the 3D audio creator more in the future.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

12. Adding video, images and audio to the book is easy.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

13. Considering the features I tried, I expect a cost saving for my cross-media production.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

14. Considering the features I tried, I expect a time saving for my cross-media production.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

15. By using the Möbius Creator toolkit, I will improve my digital skills as an author.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

16. By using the Möbius Creator toolkit, I will improve my writing skills as an author.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

17. By using the Möbius Creator toolkit, I will improve my digital skills as a content creator.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

18. Considering the features I tried, I expect the Möbius Creator will help me in improving my current practices for cross media production.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

19. Considering the features tested, the Möbius Creator will help me in the promotion of my content.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

20. I think Möbius Creator can stimulate new collaborations with professionals from other media sectors.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

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Annex 4: Impact assessment Survey for the Möbius Book Player (+ Hotjar survey)

Impact assessment of the **Möbius Book Player**

Dear participant,

thank you for the time you are dedicating to the survey.

The aim of the survey is to collect your opinion and feedback on the Möbius Book Player you tested already.
Feel free to express your honest opinion.
The survey won't collect any personal data and won't collect your email address.
The survey will take around 8 minutes.

In case of any doubts you can refer to the principal investigator of the research, Simona De Rosa at s.derosa@den-institute.org

By answering this questionnaire, you express your consent to the processing of the data you will share. According to the EU Regulation 2016/679 (GDPR) we inform you that the data will be processed by DEN Institute, and only for scientific research purposes.
The questionnaire is completely anonymous and DEN will in no way be able to link the information you share with you.
The answers generated by this questionnaire will be stored on DEN computers.
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Not shared

1. In general, how do you rate the Möbius Book Player on a scale from 1 to 5?

	1	2	3	4	5	
Very poor	○	○	○	○	○	Very good

2. I would recommend the Möbius Book Player to a friend/family member/colleague.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

3. The Möbius Book Player works the way I want it to work.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

4. I would like to use the Möbius Book Player frequently.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

5. In terms of ease of use, how do you rate the Möbius Book Player?

	1	2	3	4	5	
Very poor	○	○	○	○	○	Very good

6. The 3D audio helps me understand the story.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

6.1 If you selected Agree – Strongly agree in question 6, which of the three available features of the 3D Audio helps you understand the story most?

- ○ Narrator
- ○ Ambient sound
- ○ Music

6.2 If you selected Disagree – Strongly disagree in question 6, please let us know how we can improve.

Your answer

7. The 3D audio helps me immerse in the story.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

7.1 If you selected Agree – Strongly agree in question 7, which of the three available tracks helps you immerse the most?

- ○ Narrator
- ○ Ambient sound
- ○ Music

7.2 If you selected Disagree – Strongly disagree in question 7, please let us know how we can improve.

Your answer

8. The 3D audio hinders my focus when reading.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

8.1 If you selected Agree – Strongly agree in question 8, which of the three available tracks hinders you the most?

- ○ Narrator
- ○ Ambient sound
- ○ Music

8.2 If you selected Disagree – Strongly disagree in question 8, please let us know how we can improve.

Your answer

9. Selecting a theme is easy.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

10. Switching between audio and reading is easy.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

11. Switching between different audio tracks is easy.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

12. Do you think that the Möbius Player can increase your book consumption?

- ○ Yes
- ○ No
- ○ I don't know

Annex 5: Impact assessment survey for the Möbius PIT (+ Hotjar survey)

Impact assessment of the **Möbius Prosumer Intelligence Toolkit**

Dear participant,

thank you for the time you are dedicating to the survey.

The aim of the survey is to collect your opinion and feedback on the Möbius Prosumer Intelligence Toolkit you tested already.
Feel free to express your honest opinion.
The survey won't collect any personal data and won't collect your email address.
The survey will take around 8 minutes.

In case of any doubts or questions you can refer to the principal investigator of the research, Simona De Rosa at s.derosa@den-institute.org

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s.diakou@t-6.it Switch accounts

Not shared

1. In general, how do you rate the Möbius Prosumer Intelligence Toolkit on a scale from 1 to 5?

	1	2	3	4	5	
Very poor	○	○	○	○	○	Very good

2. I would recommend the Möbius Prosumer Intelligence Toolkit to a friend/family member/colleague.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

3. The Möbius Prosumer Intelligence Toolkit works the way I want it to work.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

4. I would like to use the Möbius Prosumer Intelligence Toolkit frequently.

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

5. In terms of ease of use, how do you rate the Möbius Prosumer Intelligence Toolkit?

	1	2	3	4	5	
Very poor	○	○	○	○	○	Very good

6. Do you see the Möbius Prosumer Intelligence Toolkit as an opportunity to incorporate your own datasets?

- ◯ Yes
- ◯ No
- ◯ I don't know

7. The data presented in the dashboard is understandable.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

8. Using the data dashboard is easy.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

9. I would like to use the data dashboard in the future.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

10. Do you think the Möbius Prosumer Intelligence Toolkit could be integrated into the tools and features you are currently using to inform your daily business?

- ◯ Yes easily
- ◯ No
- ◯ I don't know
- ◯ Yes but with difficulties

11. Do you think the Möbius Prosumer Intelligence Toolkit could be a useful tool to gather knowledge from different sources in the same place?

- ◯ Yes
- ◯ No
- ◯ I don't know

12. Do you think the Möbius Prosumer Intelligence Toolkit could potentially provide you with additional knowledge you do not have at the moment in terms of market trends?

- ◯ Yes
- ◯ No
- ◯ I don't know

13. Do you think the Möbius Prosumer Intelligence Toolkit could provide you with additional knowledge you do not have at the moment in terms of understanding readers' behaviours?

- ◯ Yes
- ◯ No
- ◯ I don't know

14. Do you see potential for the Möbius Prosumer Intelligence Toolkit to enable new revenue streams or cost savings in your business model?

- ◯ Yes
- ◯ No
- ◯ I don't know

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Annex 6: Impact assessment survey for the Möbius Immersive Experiences

Möbius Immersive experience: impact assessment survey

Dear participant,

thank you for the time you are dedicating to the survey.

The aim of the survey is to collect your opinion and feedback on the Möbius Immersive Experience you tested.
Feel free to express your honest opinion.
The survey won't collect any personal data and won't collect your email address.
The survey will take around 8 minutes.

If you tested both the Immersive experience and the Möbius box, please repeat the survey twice responding to the questions according to the experience.

In case of any doubts you can refer to the principal investigator of the research, Stella Diakou at s.diakou@den-institute.org.

By answering this questionnaire, you express your consent to the processing of the data you will share. According to the EU Regulation 2016/679 (GDPR) we inform you that the data will be processed by the DEN Institute, and only for scientific research purposes.

The questionnaire is completely anonymous and DEN will in no way be able to link the information you share with you.

The answers generated by this questionnaire will be stored on DEN computers.
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s.diakou@t-6.it Switch accounts

Not shared

* Indicates required question

I'm a :

- ○ Reader
- ○ Author
- ○ Expert in the publishing industry
- ○ Creative or artist
- ○ Other:

Gender

- ○ Male
- ○ Female
- ○ Prefer not to say

Age

- ○ <18-20
- ○ 21-30
- ○ 31-40
- ○ 41-50
- ○ 51-60
- ○ 61-70
- ○ >71

My highest educational qualification

- ◯ Secondary school/Middle school
- ◯ Baccalaureate
- ◯ Master degree
- ◯ Phd

I have tested: *

- ◯ Möbius book box
- ◯ VR experience

How would you rate your overall enjoyment of the immersive experience? Please select a value from 1 to 5 where 1 is “not at all” and 5 is “very much”

	1	2	3	4	5	
Not at all	◯	◯	◯	◯	◯	Very much

To what extent did the experience capture and hold your attention? Please select a value from 1 to 5 where 1 is “not at all” and 5 is “very much”.

	1	2	3	4	5	
Not at all	◯	◯	◯	◯	◯	Very much

Did you feel actively involved and engaged in the immersive experience?

- ◯ Yes
- ◯ No
- ◯ Maybe

Which aspect of the immersive experience impressed you the most?

- ◯ Sound
- ◯ Images
- ◯ Story
- ◯ The overall components together
- ◯ Location
- ◯ Technology used to develop the experience

How satisfied are you from the Möbius immersive experience on a scale from 1 to 5? Please select a value from 1 to 5, where 1 is “not at all” and 5 is “very much”

	1	2	3	4	5	
Not at all	◯	◯	◯	◯	◯	Very much

To what extent did the immersive experience stimulate your curiosity or creativity? Please select a value from 1 to 5, where 1 is “not at all” and 5 is “very much”

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

Do you think the immersive experience is an added value to the traditional reading experience?

- ○ Yes
- ○ No
- ○ Maybe

Do you think the immersive experience can be a way to promote reading among people with disabilities?

- ○ Yes
- ○ No
- ○ Maybe

Thinking about the immersive experience, do you think the Möbius immersive experience can stimulate the desire to read the book you explored during the experience? Please select a value from 1 to 5, where 1 is “not at all” and 5 is “very much"

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

Thinking about the immersive experience, do you think the Möbius immersive experience can stimulate the desire to read books in general? Please select a value from 1 to 5, where 1 is “not at all” and 5 is “very much”.

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

Would you like to experience other books through an immersive experience?

- ○ Yes
- ○ No
- ○ Maybe

Would you recommend this immersive experience to others? Please select a value from 1 to 5, where 1 is “not at all” and 5 is “very much”

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

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Annex 7: Protocol for observation - Fantastic Adventure Night

Room:
Timeslot:

<table>
<tr><th colspan="5">Main information to observe</th><th>Additional notes and observations</th></tr>
<tr><td colspan="5">Number of people and description of who is observing the immersive experience OR Number of people and description of who is experiencing the MIBB (total number for the entire duration of the experience)</td><td></td></tr>
<tr><td colspan="5"></td><td></td></tr>
<tr><td colspan="5">Breakdown of the visitors, taking notes on the following categories</td><td></td></tr>
<tr><td>Age</td><td>Sex</td><td>Disabilities/ Minorities</td><td>Anything that might indicate membership in groups or in sub-populations of interest to the study, such as profession, social status, socio-economic class, or ethnicity</td><td>Other</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Traffic in the venue: how many people enter, leave, and spend time at the observation site (e.g. who stays more time, who leaves earlier, etc)</td><td></td></tr>
<tr><td colspan="5"></td><td></td></tr>
<tr><td colspan="5">Physical behaviour: what people do, who does what, who interacts with whom, who is not interacting (e.g. are they fixed in a point, do they move, etc)</td><td></td></tr>
</table>

Which are the main feelings when people interact with the immersive experience/MIBB (e.g. do they smile, are they surprised, are they confused, etc)	
Which are the main expressions/wording that is possible to hear in the room (during or after the experience) in reaction to the installation?	
Does it seem that the audience is satisfied/confused/want to learn more?	
If any disabled people were in the room, were they confident with the experience? How did they interact with the experience?	

Annex 8: Questionnaire for impact assessment - Fantastic Adventure Night

First step: Introduce who we are, the scope of the project and ask if the attendee is available to reply to some questions.
Second step: if he/she agrees, present the informed consent, and take the signature
Third step: Start recording and making the questions.

N.	Indicators	Questions
0	User group	Are you a: - Reader - Author - Professional in the publishing industry - Creative or artist - Other: specify Take notes on gender and age (20-30; 31-40; 41-50; 51-60; over 61)
1	Impact on the fruition of multimedia book experience	Thinking about the immersive experience/mobius box, do you think it can stimulate the desire to read books? Why (not)?
1.1		Do you think you will read Giulio Ravizza's book? If so, why? If not, why? Do you think that, in general, such an experience might inspire people to read Giulio Ravizza's book? If so, why? If not, why.
2	Impact on the use of technology	What are the positive aspects you will remember from this experience? What are the negative aspects? What aspect could be improved?
3	Impact on the use of technology	What you have seen is a preview still under development. Do you have any expectations or curiosity about its final development? Would you like to receive updates about the final show?
	Question only for professionals	

	Impact on Knowledge production; Impact on Education; Impact on Behavioural Change	Thinking about the immersive experience/Möbius box, do you think it can inspire new art forms and cross-media productions or is its impact from this point of view irrelevant? What would you describe as the impact of this experience for future storytelling?

	Impact on accessibility to older adults, people with disabilities	We won't ask a specific question, but we will try to get from the general discussion, how fragile people (if any) perceived the box/installation in relation to their disability

Annex 9: Consent form

Participant consent form

I agree to participate in this study providing feedback and opinions on the tools developed by the Möbius project.

Möbius is an initiative funded under the European Commission Horizon 2020 programme that aims to modernise the European book publishing industry by remodelling the traditional value chains and business models, uncovering the prosumers potential and delivering new enriched media experiences. More information about the project can be found at https://mobius-project.eu/.

I understand that my involvement is entirely voluntary and that I am free to withdraw at any time.

I agree that my participation has been fully explained to me by the researchers conducting the study.

I give permission to collect my email address. The email address won't be shared with anyone, and it will be used only for research purposes. Specifically, I will receive a follow-up email to participate in a survey about my experience.

I understand that any personal data pertaining to me will remain confidential by being stored securely by researchers at DEN, Belgium, and will be anonymised in any outputs resulting from this study so that individual participants will not be identifiable.

I understand that I can revoke this permission at any time.

I have been given a copy of this form.

Name: _____

Signature: _____ Date: _____

Signature of researcher _____ Date: _____

For further information, please contact:
Dr. Simona De Rosa - s.derosa@den-institute.org
Dr. Stella Diakou - s.diakou@den-institute.org