BREAKING EDUCATIONAL BARRIERS WITH CONTEXTUALISED PERVASIVE AND GAMEFUL LEARNING

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EXECUTIVE SUMMARY

This report describes the two potential partnership structures that can be built after the consortium dissolves, in order that the exploitation plan beyond the project timeline can be executed, and the BEACONING project outcome can be sustained.

After the role of sustainability plans, in relation to the standardization, exploitation and business plans have been explained, the third section describes i) sustainability approaches of similar project, ii) the two options that are currently taken on board and iii) the assessment framework using which the most suitable option will be taken. The two potential partnership structures are

1. **Forming an alliance**, which would be have an association structure, not for-profit but for organizing events, disseminating, facilitating communication and promotions. By means of such an alliance, ex-partners from the consortium can keep collaborating, or bring third parties when necessary (or maybe expand and take new allies in), so that improvements and maintenance can be sustained, as well as marketing. The alliance may require a fixed membership fee, or we may have to find sponsors/donors.
2. **Forming a dedicated company**, exclusive to game-based learning product development and sales based on BEACONING outcome. All IPR will be transferred to this company with a blanket agreement of all partners. A revenue sharing structure must be established and terms & conditions must be set up front.

The assessment framework for the viability of sustainability options consists of three dimensions; namely economic, technological and societal sustainability dimensions, and for each dimension factors to be checked or criteria to be met are identified. Finally, a roadmap for 2018 to choose and realize the option is charted.

TABLE OF ABBREVIATIONS

KPI: Key Performance Indicators are quantifiable measures that can be used to evaluate the success of an organization, an endeavour, a product etc. in meeting initial objectives for performance.

PEST: Political, Economic, Social and Technological are external factors that commonly affect business activities and performance. PEST Analysis aims at identifying these factors so that right decisions can be made, at the right time.

ROI: Return On Investment, measures the gain or loss generated on an investment relative to the amount of money or other resources that are invested.

STEM: Science Technology Engineering Mathematics, is a curriculum based on the idea of educating students in an interdisciplinary and applied approach.

SWOT: Strengths, Weaknesses, Opportunities, Threats is a situational analysis tool for decision makers that involves assessing internal aspects of an entity as strengths or weaknesses and the external situational factors as opportunities or threats.

TAM: Technology Acceptance Model aims to model how users come to accept and use a technology, by breaking down, surveying and calculating factors that effect “perceived usefulness” and “perceived ease-of-use.”

1 SCOPE AND OBJECTIVES

This report is based upon twofold activities - first on the dissemination activities carried out in WP2 aiming at creating awareness of the BEACONING output and products as well as nurture the need for such solutions. Secondly, it is based on the business models developed for the different project components. In some cases, these are localised, in the others they are the same for the whole partnership depending on the user and market requirements.

The early draft version is delivered in month 24 and thereon used as a working document; refined/updated to be delivered as a final version in month 36. The final version of the deliverable will take into account the cost-benefits analysis as well as the SWOT analysis given in D7.1 in determining factors for economic sustainability assessment. Calculation of different ROIs using scenario analysis will complete the economic assessment. Technological and societal sustainability assessment will be made based on the large-scale piloting results. These three dimensions, which are essential part of any PEST analysis will assist the project partners in making decisions about the availably sustainability options.

The early draft version includes two options for potential partnership structures. During the final year of the project these options will be evaluated in the light of the three dimensional assessment framework.

The advances on the document is planned to start already in month 25 (January 2018), since the legal terms and conditions to be cleared with collaborating organizations are anticipated. The final version is also expected to be reviewed by stakeholders.

2 RELATION TO INTERNAL AND EXTERNAL BEACONING ENVIRONMENT

2.1 STATUS OF THE WORK ON SUSTAINABILITY

In this section, the main interrelations between this document and the other work plans of the BEACONING project will be examined, including

i) its use of the specific application scenarios and demonstrators serving as validation for the theoretical work (WP5 Unit Testing and Small Scale Pilot, WP6 Large Scale Pilot),
ii) its leveraging function of other plans in WP7 Exploitation, Impact and Standards,
iii) its relying on the key findings elaborated in WP3 and the need to take into account the technology watch, as well as
iv) its strict relationship with WP6, notably the evaluation framework depicted in it and the related KPIs (T6.1.3).

2.2 THE ROLE OF SUSTAINABILITY IN WORK PACKAGE 7

D7.1 : Technology watch [M12 with and updated in M24]

This informative report is comprised of a detailed market and trends analysis. Different needs of the different market segments, the competitive landscape that is set to meet those needs and reflections on the BEACONING components are covered, as well as a SWOT analysis to help shaping the exploitation plans.

The sustainability report uses the findings to justify the investment that is needed to establish the structure (one of the two options) that would take over the outcomes beyond the project completion deadline.

D7.2 : Preliminary Exploitation Strategy [M18]

The preliminary Exploitation Strategy presents the BEACONING exploitation framework as well as the individual exploitation plans. It is also an initial attempt at describing the marketing channels for the products and their business models.

The sustainability report considers the vehicles by which this exploitation strategy can be executed.

D7.3 : Final Exploitation Plan [M32]

This deliverable will report on the exploitation activities that are already carried out and will benchmark the activities against the KPIs defined in task 2.1. It will detail the key objectives, the anticipated project outcomes, the strategy, the implementation, and the responsibilities.

The sustainability report is an input, and it will inform this work as to the nature of the structure that will carry out the exploitation plan. In a sense, the sustainability structure is the subject for the objectives in the exploitation plan.

D7.5 : Report on standardization [M24 with and updated in M36]

Standardization is about lending certain elements of exploitation to techniques and technologies so that the final product can scale easier.

The potential standardization pathways inform the sustainability vehicle as to the potential of the scale, the size of the market that can be reached in practice.

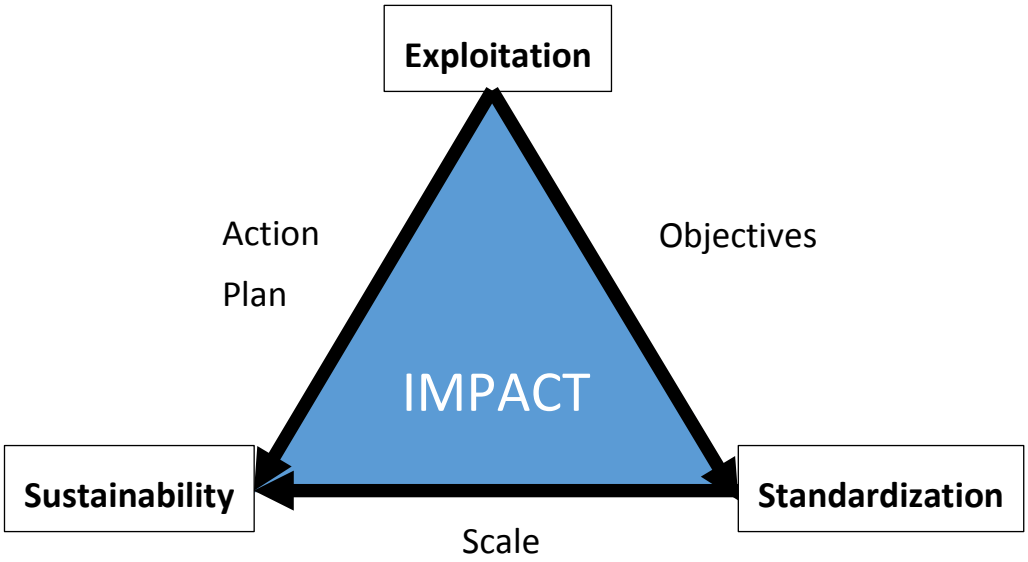

Figure 1 The Impact Triangle

As explained above, there is a close relationship among the three plans that govern the work in WP7. In fact, the common aim of all three plans is to serve the realization of the intended impact, the core vision of the project, which is to increase the engagement in and the inclusiveness of education in STEM subject areas. Figure 1 depicts this relationship. Exploitation plan provides objectives for standardization and an action plan for the sustainability vehicle, while standardization plan informs the sustainability plan about how to scale.

As for the other work packages, there is relevant work as well, in particular about the dissemination channels for "reaching" the entire market, early adopters that can be used as leverage, and how to get better in addressing the needs of various stakeholders. The next section is a brief on the deliverables of other work packages that relate to sustainability.

2.3 THE ROLE OF SUSTAINABILITY IN OTHER WORK PACKAGES

All work packages in the project has certain work items that relate to sustainability. T1.4 in WP1 carries out a "risk and needs analysis" which is regularly updated throughout the project. The risks that are identified in this task also translate to risks in impact. The dissemination results reported in WP2 are evidences about the reach of the project, which can be leveraged by the sustainability vehicle (be it an alliance or a company).

D3.7 in WP3 will cover iterations, refinement and updates on the specifications, based on the first round of pilots. The questionnaires that are prepared to reveal the needs and intentions of various stakeholder groups in this task will inform the sustainability plan. As for the reasons of those needs and intentions, the work on sustainability can turn to WP5 & WP6 where piloting results will be compiled and analysed. D6.3 Validation and usability report (M36) and D6.4 Finding Analysis Report (M36) will deliver all the lessons learned from the large-scale pilots that partners have committed, which will shape the value-adds and target market segments to focus for sustainability.

3 SUSTAINABILITY FRAMEWORK AND CONCEPTS IN BEACONING

3.1 STATE-OF-THE-ART ON SUSTAINABILITY APPROACH FOR DIGITAL LEARNING SOLUTIONS

The BEACONING sustainability model has been defined taking into consideration other projects' sustainability approaches for digital learning solutions offerings (e.g. TELLME, Rethink Learning, Self-Learning). In order to decide the approach and features of BEACONING paradigm for sustainability, dimensions should be defined, which will be considered within this framework, i.e. moving from the given business scenario types and examining them according to the chosen business model to answer certain questions. The analysis of previous experiences provided the Consortium with an insight to the challenges identified in T2.1 towards strengthening the take up of the innovative results developed within BEACONING.

References were made also to the findings of the study on sustainability factors of international cooperation projects, especially to recommendations, such as "Moreover, innovative projects can be riskier if they fail to correspond to the specific needs and constraints of the partner country and especially of the target groups." In fact, this European Commission study, despite being from 2006, contains analysis and recommendations applicable to BEACONING[1].

3.2 BEACONING SUSTAINABILITY MODEL

Moving from the examination of sustainability approaches of other projects that offer digital learning solutions, BEACONING sustainability approach aims at identifying a "Transformative Purpose" for each foreground in the project. United by this purpose, the entity that will sustain the foreground beyond the project and its "Target Audience" would agree on the "Value Proposition."

The foreground and related properties are given in Appendix A of this document.

The sustainability task in WP7 is to agree on the nature of this entity and accomplish its establishment. In order to make the right decisions, the sustainability approach takes on board certain dimensions and factors that should be considered; Moving from the given business scenarios and examining them according to the chosen business models, the partners will inquire along these dimensions. The BEACONING consortium consist of industry, academia and educational representatives. Depending on their line of activity, each partner has its respective interest and intended applications of BEACONING technology and assets.

Table 3 in Appendix A lists the expected foreground of intellectual property in the project; which foreground is open, which is not, and which are most likely to become licensed models. Moreover, global purposes and value propositions of the inventions are covered, together with target customer segments and potential monetization options. This study provides the Consortium information to complete the sustainability assessment framework explained in Section 3.3, below.

In addition to the consideration of foreground, a comprehensive understanding of BEACONING sustainability will rely on:

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[1]European Commission, Directorate-General for Education and Culture (2006). "Handbook on Sustainability," Retrieved from: http://eacea.ec.europa.eu/tempus/doc/sustainhandbook.pdf

- the consideration of different stakeholders' perspectives, specifically targeting the market segment relevant to the educational strategy development value chain, including educational technologies, schools, etc., realized as part of the exploitation plan and business models in T7.1 and described in D7.2 "Preliminary Exploitation Strategy":
    - Solutions provider
    - Software provider
    - Learning provider
    - Consultancy
    - Pervasive learning community
- List of exploitables as defined product to sustain initially
- License models that will be explored.
- A twofold approach
    - Mid-term viability and sustainability: Short term gains can have an impact on mid-term evaluations. Early exploitables from the project can be quick hits, which are also an avenue to sustainability since they present 'the next" or 'the upcoming" big products of the project. This drives curiosity but more than that, it drives anticipation to keep things fresh. For BEACONING Gamified Lesson Plans, keeping things fresh will ensure continuous uptake. In the gaming industry, without such an approach, even hit products can become obsolete in a short period.
    - Long-term viability and sustainability, including also "replicability" issues, "governance" vehicle and Alliance Program. Two approaches to take the responsibility of sustainability are under assessment, namely i) a new company ii) alliance
- A close interrelation with the exploitation results, and related IP Strategy and Standards, by building and implementing the Sustainability Framework around the main outcomes of the project
- In line with the mid-project review recommendations, the consortium has decided to launch two early products during the first half of 2018. These products will include, as recommended – the location-based application and the authoring tool. A location-based gaming event will be setup as an introduction event for the public with a teaser for the BEACONING movement. In order to quickly put BEACONING solutions out, to gauge interests and awareness from the general public/industry, a location-based afternoon with BEACONING across the selected EU cities. The plan is to create location-based activities based on the landmarks in those cities, where different mini games as well as contextual challenges can be triggered. This will showcase the context-aware application and the mini-game elements. Collaboration with local partners and sponsors is also indicated (e.g. UNESCO, Dyslexia International), for i) to increase visibility and reach to various stakeholders ii) to increase player-learner motivation iii) inform mid-term evaluations as to the market needs and aspirations.
- The next step in line with the piloting tasks, a GLP Hack/Jam will be organised – where users can create their own quests, run them and promote them. Besides promoting early project outcomes, these events will also help determining target groups, which are most likely to be early adopters.

3.3 SUSTAINABILITY ASSESSMENT FRAMEWORK

This chapter outlines the Sustainability Assessment Framework, describing the selected methodology, tools, critical indicators and target value, whilst the plan for assessment operations and activities is presented in the next section.

The critical indicators will partially coincide with the Key Performance Indicators (KPIs), as used in other work packages. They will be considered under the specific viewpoint of viability and uptake of project solutions. Other indicators will also be set, specifically for sustainability assessment purposes. Each indicator will be captured with its description, the evaluation criteria, the means of measurement and the target value at the end of the project. The framework will sketch the **technical**, **economic** and **societal** sustainability assessment indicators, both for localised business models based on scenario analysis and business models at consortium level. The initial market positioning findings, notably PEST, SWOT, market barriers and competitive pressure will be taken into consideration.

A framework that will focus on the above three performance pillars, will assess the resulting data and analysis about the critical indicators set in this early version of sustainability plan. The results will be incorporated to the document, and will be reported in the next release.

3.3.1 Economic Sustainability Assessment

This pillar will refer to the financial viability and associated business potential of the BEACONING platform and associated services, including cost-benefits analysis, SWOT and calculation of different ROIs using scenario analysis.

3.3.2 Technological Sustainability Assessment

Within the technical and technological sustainability assessment of the BEACONING platform and services, factors such as performance, scalability, availability, reliability, ease of use, technological longevity, interoperability will be evaluated, but only in relation to viability and replicability.

3.3.3 Societal Sustainability Assessment

This performance pillar: the Sustainability Assessment Framework intends to capture the user perspective and efficacy by identifying the methodologies and tools that will support capturing feedback from all the selected and targeted stakeholders, outlining the related methodology, tools, critical indicators and target value considered under the specific viewpoint of viability and uptake of project solutions.

Feedback from the relevant stakeholders will be solicited, based on questionnaires, interviews and direct discussions. This feedback will be analysed towards deriving main conclusions about the opinion of the end-users about the BEACONING solutions and overall approach.

The selected assessment methodologies, tools, and critical indicators are aimed at facilitating the users' evaluations to have measurable results. Therefore TAM (Technology Acceptance Model) and Performance Indicators Benchmarking (KPIs) are chosen based upon similar practices followed by other projects. The tools that will be used for the Societal Sustainability Assessment are selected accordingly, so as to achieve the objectives of the methodologies. The critical indicators are defined based on the measurement of the use, satisfaction, interest level and needs of the users, as well as awareness of the stakeholders. The value of measurement was defined in two folds: for the mid-term and for the final term (so that the expected progress can also be evaluated.)

<u>Methodologies</u>:

- TAM (Technology Acceptance Model), which may be adjusted in some cases: its basic concepts refer to Perceived Usefulness, Perceived ease of use, Behavioural Intention to use, Actual system use=> Experience and Attitude (acceptance)
- Performance Indicators Benchmarking: a list of critical indicators is identified and it is the basis of monitoring BEACONING performance in terms of expected viability and uptake of its

solutions. These indicators allow to monitor how effective and sustainable are the services/platform, as well as their impact.

Tools

The tools, which will be used for assessment by applying these two methodologies were selected according to the objectives of the methodologies and include surveying, interviewing and applying usability tests to the users and stakeholders.

- Questionnaire/survey, for capturing quantitative information on user experience and attitude;
- Interviews (or focus groups), for capturing more qualitative information on the same concepts;
- Usability Testing, involving interaction with users, will be realized through participant observation.

Table 1 Critical Indicators for Societal Sustainability Assessment

CI name and number	CI description	Assessment Criteria	Means of measurement	Target Value	Expected Progress
1. User Friendly	User friendly service / app	Percentage of the positive answers to all questions on user friendliness, user perception of the design and features of the developed application	Questionnaires	80% positive answers	50% positive answers
2. Reliability	Reliability of the service/app/platform	Number of reported issues	user-reported data	0-5 issues	more than 5 issues
3. Legitimation of results	Degree in which the delivery of BEACONING solutions has been legitimized by most of the involved stakeholders / users	Level of valuation of each stakeholders group in the innovation process	Interview/questionnaires	75%	50%
4. Matching between stakeholders' feedback and BEACONING solutions	This indicator allows to assess if there is correspondence between ideas and feedback coming from the user-base and the final developed services	Correspondence of the developed services to stakeholders' ideas/requirements	Interviews/questionnaires	75%	50%
5. Users' satisfaction	Indicator of the users' perception of compliance with their desired outcomes in terms of their involvement and uptake of their feedback into BEACONING	How much users were pleased with their involvement in BEACONING project	Interviews/questionnaires	75%	50%

	solutions				
6. Awareness Creation & Industry Outreach	Creation of awareness of the BEACONING output and products and nurturing the need for project solutions. This also includes Industry and Sector outreach, for instance involving stakeholders such as industrial associations. This is correlated with dissemination activities.	Participation to stakeholders' events and organization of bilateral meetings with potential uptakers of BEACONING solutions	Number of events and bilateral meeting	10	5
7. Research community outreach	Research community outreach and triggering opportunities for cross sector impact (i.e. applying the BEACONING approach to other sectors)	Participation to research events and liaison with other EU and national initiatives and projects	Number of events and liaisons	10	5

4 FUTURE PLANS

This section points out the future activities to be performed both during project execution and after its end, besides giving some guidelines and recommendations.

4.1 COMMERCIAL EXPLOITATION VEHICLE

This part of the document is aimed at defining the organizational architecture supporting the post-project collaboration among BEACONING Consortium's members, in view of the successful joint exploitation of project results, including both a wider adoption and take-up of them at commercial level and a significant impact at scientific level.

BEACONING Consortium is considering two main options as regards the governance structure and exploitation vehicle to be set up and launch for long-term sustainability.

These two approaches to take the responsibility of long-term sustainability are:

I. New Company

This option refers to the formation of a new commercial entity, whose focus is exclusive to game-based learning product development and sales based on BEACONING outcome. All IPR will be transferred to this company, and project partners will share the revenue under the terms and conditions to be agreed.

This alternative includes a product development programme and a strategy for innovation management (e.g. using net income from exploitation, to support post-project research and development).

In case this model is preferred based on the assessment framework, BEACONING Executive Board will have to take decisions about this type of exploitation, building a conventional business case for a new company, both within and beyond the project lifetime.

Taking a strategic (3–5 years) approach, the Executive Board is requested to:

i) outline the options for the types of business for this New Company that could emerge from BEACONING activities, considering both the market environment that the business would operate in and the products that could be offered (as described in D7.2). Types of business activity can be, for instance, a solutions company, a software company, a training company, a consultancy and a community/networking company;

ii) define the New Company's objectives, preferring a broad approach in its objectives and, importantly, not only develops a game-based learning product development and sales but also includes an outreach programme which builds a stakeholders' community and develops an influencing strategy, for example taking a lead in standardization activities related to game-based learning in the targeted market sectors;

iii) Exactly define the products that could be offered, considering the market environment that the business would operate in;

iv) Decide Company's activities and funding methods (EU funding sources, venture capital funding, investment from partner companies or loans, etc.), answering to questions like: "What do we do in the company?" "Other new projects?" "Crowd funding?"

v) Consider and decide upon practical and operative issues towards the creation of a New Company:

a. Location, in particular deciding in which country the company will be registered. This also sets the legal framework for operations and may affect the choice of funding opportunities. Factors to consider include:
    - Which partners of BEACONING will be most involved in the NewCo?
    - Views of potential investors
    - The degree of protection provided by the legal framework to the company and its directors
    - Favourable tax regime and administrative simplicity
    - Any minority views expressed by Consortium partners

b. Initial shareholders, giving all BEACONING partners time to join on the same conditions. The first round of shares can be restricted to individuals participating in the BEACONING project. Multiple waves of shares are planned. It has to be considered, if all partners wish to participate in forming the new company, how each will participate in the build. In case no all the partners wish to be involved, the relationship with these partners has to be taken into account.
c. Technical expertise and staffing
d. Other (bank account, directors' appointment, etc).

II. Alliance

This option refers to the formation of an alliance, which could be a kind of association, not for-profit. It will convene events and facilitate communication and liaisons, so that partners can help each other or bring third parties when necessary. It will assume the responsibility to update software and games, sustain dissemination, marketing and promotions. The alliance may require a fixed membership fee, or it can be supported by sponsors/donors.

In case the alliance model is chosen, the following factors apply:

i. Creation of an autonomous additional legal entity in respect to each partners' organization, but with a malleable and versatile legal structure,
ii. being at the same time scantily binding for its members and
iii. able to allow the greatest opportunities of initiatives for each of its members;
iv. Maintenance of each partner' independence and original businesses and activities;
v. Openness to further accessions: the alliance has an open structure. In this way, other parties will be able to join it when already operating, without the need to modify neither the certificate of incorporation nor the status.
vi. Easy involvement of scientific and research partners together with industrial players, with equal dignity and value of each of the new associates, also as regards to the governing bodies.
vii. Valorisation and promotion of the alliance as highly qualified collaborative organization and consequent promotion of its common brand;
viii. Relevance of the contractual regulatory framework for the key aspects (besides the legal provisions), such as operational rules, conditions for the accession, identification and description of rights and duties, liabilities, governing bodies' and management structure's tasks and composition, decisional and management processes, etc.;
ix. Ease and low costs both of the creation and operational phases;
x. Fiscal incentives and advantages in many countries.

The Alliance can also take the form of a Joint Venture, which, in its stricter notion refers to an alliance among partners, based on a specific collaboration agreement, by which two or more organizations, also coming from different countries and often very different from each other, decide to cooperate, though preserving their autonomy and independence, for the achievement of a

common goal, potentially able to grant an economic benefit to every partner (often it is related to the realization of a joint commercial or industrial work/project), by sharing resources, exploitation of the reciprocal competences and capabilities, fair allocation of costs, risks, profits and possible losses related to the investment.

In particular, in BEACONING the unincorporated joint venture can be chosen. This entity is based only on a contract and no new legal entity is created. This type is usually chosen for short-term projects and co-ventures' responsibility is unlimited.

ROADMAP

The following roadmap towards seeking consensus and setting up the chosen option has been sketched:

1. discussion within BEACONING partners, on the occasion of project meetings and in more restricted consultations, for at first eliciting requirements and then drawing conclusions and taking decisions based on them;
2. careful examination of advantages and disadvantages of the identified relevant alternatives, using the assessment framework.
3. Executive Board actions
    - ratify the choices proposed by WP7 Leader, in conjunction with WP7 partners, motivated on the basis of the consultations under point 1 here above or amend it. This should be done in its next general assembly
    - agree on the procedure for progressing towards a company or an alliance
    - discuss IPR issues
    - investigate if there are additional prospective collaborators/ funders /strategic partnership
    - refine a detailed business plan, based on previous WP7 deliverables, exploitation vehicle choice and further market investigation

4.2 BEACONING: STATE OF PLAY AND THE WAY FORWARD

This chapter reports discussion and the advancements realised in relation to BEACONING long-term sustainability, as well as further activities to be considered.

The alliance model can be formed among BEACONING partners who can have a major role in business operation and development. Legal setup for commercial participation to the alliance must be studied. A detail methodology and setup will be defined. In principle, this sustainability option would better suit, if there arises interest in supporting BEACONING, by organizations other than existing consortium partners.

If the alliance is in the form of a partnership, this can be formed from BEACONING selected partners and commercial organisation either as a new company or as a joint venture or in the context of a technology transfer model. Different combinations can be considered between the project partners and external organizations/content providers, but it is important that each role is clearly defined and settled, by the specific agreements. The more suitable revenue model in order to ensure a stable revenue stream can be a combination of the Advertising, Public-Private Partnership, Sponsorship, Joint Venture, Technical Support and Commercial Content models.

In this context, the Public–Private Partnership alliance model can be used as a joint venture between partners and private e-learning organizations or between ministries for educations of various countries and private e-learning commercial organizations.

Finally, the technical support, training, and platform updates according to the need of the demand side can create extra revenue out of the afore-mentioned resources.

It is important to propose an efficient and effective new business model. However, this requires exploring possibilities of new and innovative ways of conducting business to operate instead of traditional approach.

The business plan will be regularly reviewed after having inputs from market researches, marketing positioning and recommendations. The emerging social networks and multimedia applications can be good components for the business model to meet the requirements of key stakeholders.

4.3 PLAN FOR SUSTAINABILITY ASSESSMENT OPERATIONS AND ACTIVITIES

The plan includes sustainability assessment operations and activities to be executed until the end of the project and it applies to each of the three pillars described in Section 3. It is structured in actions, composed by activities. The table below highlights, for each of the activities, the timeline, the partners involved and their responsibilities/tasks in the execution of the operations. In particular, the e actions on analysis & assessment of gathered data will take place during the last months of the project, after the large scale pilots of autumn 2018.

Table 2 Sustainability Actions Plan

<table>
<tr><td>Action 1</td><td colspan="6">Tools design and creation & Methodologies Customization</td></tr>
<tr><td>Description</td><td colspan="2">This action is functional to the design, development and update of assessment tools to be used, as well as to analyse and, if necessary, adapt and customize evaluation methodologies i</td><td>Start month</td><td>25</td><td>End Month</td><td>26</td></tr>
<tr><td>Name of the Activity</td><td>Description</td><td colspan="2">Timeline</td><td>Partners involved</td><td colspan="2">Responsibilities of partner involved</td></tr>
<tr><td rowspan="2">1.1 Tools design and creation</td><td rowspan="2">Discussion, design, final definition and development of the tools to be used in each of the evaluation iterations, including those to be used in the pilot sites and, in general, all tools necessary in relation to the KPIs categories. Final and updated choices also about</td><td>Start Month</td><td>25</td><td rowspan="2">WP7 Leader, WP7 Task Leaders, pilots</td><td colspan="2" rowspan="2">SEBIT coordinates the activity and, together with WP7 Task Leaders, prepares the tools.</td></tr>
<tr><td>End Month</td><td>26</td></tr>
</table>

	implementation specific modalities, including possible changes to pilot plans				
1.2 Methodologies Customization	Analysis, discussion and, if necessary, adaptation and customization of the methodologies	Start Month	25	WP7 Leader, WP7 Task Leaders, pilots	SEBIT coordinates the activity and, together with WP7 Task Leaders, analyses the methodologies and, if necessary, adapt and customize them.
		End Month	26		

Action 2	**Evaluation activities implementation**					
Description	Implementation of Economic, Technological and Societal Sustainability Assessment operations		**Start month**	M27	**End Month**	M32

Name of the Activity	**Description**	**Timeline**	**Partners involved**		**Responsibilities of partner involved**
2.1 Economic Sustainability Assessment Operations	The activities planned for economic sustainability evaluation are conducted, with special focus on BEACONING pilots	Start Month	27	SIVECO, SEBIT, ORT, other WP7 partners, WP Leaders, pilots	SIVECO coordinates activities. WP7 partners, WP Leaders, pilots contribute and cooperate
		End Month	32		
2.2 Technological Sustainability Assessment Operations	The activities planned for technological sustainability evaluation are conducted, with special focus on BEACONING pilots	Start Month	27	ATS, other WP7 partners, WP Leaders, pilots	ATS coordinates activities. WP7 partners, WP Leaders, pilots contribute and cooperate
		End Month	32		
2.3 Societal Sustainability Assessment Operations	The activities planned for societal sustainability evaluation are conducted, with	Start Month	27	ORT, other WP7 partners, WP Leaders, pilots	ORT coordinates activities. WP7 partners, WP Leaders, pilots contribute and cooperate
		End Month	32		

	special focus on BEACONING pilots							
Action 3	**Analysis & Assessment of gathered data**							
Description	In this action data collected in the implementation of sustainability assessment activities, as planned in Action 2, are analysed and assessed. Assessment results are then consolidated and reported so that a decision is made on the structure that will carry out the sustainability plan beyond the project timeline.			**Start month**	M33	**End Month**	M36	
Name of the Activity	**Description**	**Timeline**		**Partners involved**	**Responsibilities of partner involved**			
3.1 Analysis of data collected	Analysis & assessment of data gathered in each of the pillars.	Start Month	33	SEBIT and other WP7 Task Leaders and partners	SEBIT analyses and assesses the data, with the support and contribution of other WP7 Tasks Leaders and partners			
		End Month	34					
3.2 Sustainability Assessment Report	Consolidation and reporting of the analysis of assessment results for each of the pillars, in order to be used for improvements of project's outcomes.	Start Month	34	ORT and other WP7 Task Leaders and partners	ORT reports the assessment findings for each pillar, with the support and contribution of other WP7 Tasks leaders and partners.			
		End Month	36					
3.3 Sustainability Structure	Establishing one of the two structures described in Section 4.1.	Start Month	33	All partners	ORT and SEBIT will present the assessment reports to the partners, mediate the decision of structure and required proceedings.			
		End Month	36					

5 CONCLUSIONS

This is an early draft about the sustainability plans of the consortium, especially the commercial partners in WP7. It is intended to be a working document with a final release at the end of the project with an analysis of sustainability assessment data and, on the basis of that, and the lessons learnt, specific recommendations and suggestions for fostering sustainability after the termination of the project.

The assessment framework given in this version will involve questions to be answered about factors and criteria that must be addressed when making a decision about the sustainability vehicle, whether it is an alliance or a company. It is very likely that only the higher management of each partner or their legal/financial departments can answer these questions. Therefore, a roadmap is charted to carry out all the necessary tasks to establish such a vehicle during the last year of the project. This is the work under “T7.2 Impact and sustainability analysis (M21-M36)” and already foreseen in DoA to take place in 2018.

The two options for sustainability are not absolute. Other options such as one partner having all the IPRs and exploiting the product, while the rest of the partners becoming third parties with privileges are also discussed. However, this particular option makes sense only when such partner owns most (if not all) the IPR, and in this project IPR seems to be spread, with various components depending heavily on the background of specific partners, which is natural for a project of type “innovation action.” Reducing the options to two options makes this already complicated subject a little bit more confined to progress easier.

APPENDIX A – THE LIST OF BEACONING OUTCOMES TO SUSTAIN

The below table is a derivative from the BEACONING submission to DG Connect's Innovation Radar Questionnaire (IRQ). The IRQ practice involves a deliberation of each innovation out of the project and a list of questions to be answered about them. The table carries this inquiry further by specifying attributes such as "transformative purpose" and "value proposition."

Table 3 Expected Project Foreground

Title	Description	Transformative Purpose	Target Audience	Value Proposition	Target Customer	Monetization	Need for Localization	Need for Training	Dependencies	Market Dynamics
Beaconing Platform and Ecosystem	An innovative platform that extends our scientific understanding and practice-based experiments of engaging a community of learners including those with disabilities with a more inclusive, connected and contextualized learning. This is achieved by integrating technologies, pedagogical and social perspectives of using pervasive, context-aware and gamified approaches	Ignite a need for learning by means of playful challenges	Students, including those with learning difficulties and their teachers	Efficient and fair use of study time with playing and learning	Educational Service Providers, including public and private administration; Foundations that support next gen education	Donations; Freemium; Marketplace	As a platform, only language translation; As for content and lesson plans, need for alignment with local curricula and culture.	None for students; Short training for teachers but some practice with adapting gamified lessons and group management	Some business models require Integration with an LMS or another educational platform which is already being used by the target audience	Educational service providers across the world are seeking ways of making learning more meaningful, engaging and relevant for students. Game-based learning is a growing market for specific domains such as language training and at risk groups (e.g. Middle school math anxiety).
Authoring Tool	The Authoring Tool enables the learning designers to parametrize plots and challenges in games. The parametrization of plots encompasses the changing of game variables such as the name of characters and dialog content. This allows a gamified learning session to be customized to the classes' context and reality. The possible mini-games to be used are loaded from the core services' list of mini-games, each with their own list of possible parameters. This way, a learning designer or teacher may choose which mini-games should comprise the challenges of a game's session, as well as each individual mini-games' content.	Blending learning with gaming for higher enthusiasm.	Teachers, instructional designers	Introducing gaming into lesson plans with minimal effort	Educational Service Providers, including public and private administration; Foundations that support next gen education	Free tool to promote either the platform or individual GLPs	Only language translation if the teachers do not speak any English	The authoring process is not self-evident. 1-2 hours of training and guiding is needed.	Gameplots	Lesson Plans on digital learning platforms increasingly allow teachers to customize, as teachers get more and more accustomed to ed-tech. Almost all platforms seek to provide such flexibility.

Title	Description	Transformative Purpose	Target Audience	Value Proposition	Target Customer	Monetization	Need for Localization	Need for Training	Dependencies	Market Dynamics
Context Aware Challenges Authoring Tool	Context Aware Challenges Authoring Tool enables learning designers and teachers to think of learning in a new and innovative way offering an authoring tool to create educational location-based games with no need for programming skills. It extends the learning experience outside the classroom using playful activities engaging students better in the learning process with a more immersive and exploratory experience. This Authoring tool use three tracking technologies: Beacons; GPS and QR codes.	Shift your students' learning, as well as device use patterns by introducing mobile learning.	Teachers, instructional designers	Introducing mobile learning into lesson plans with minimal effort	Educational Service Providers, including public and private administration; Mobile operators that seek value-added data services.	Free tool to promote either the platform or individual Geolocation Games	Language translation if the teachers do not speak any English. PLUS, local landmarks, or beacon networks must be entered into the system.	The authoring process is not self-evident. 1-2 hours of training and guiding is needed. However, many examples should be provided to showcase the properties of effective design.	Local landmarks, beacon service providers or QR codes on check points.	Most geolocation games and activities are free with short life spans. However, beacon service providers are expanding and they like to promote their networks with such free activities.
Minigames	The mini games are part of the Beaconing game bundle and are short and engaging game experiences to train and assess students' STEM skills. They have been developed using a web based approach, and this provides a high degree of portability so that mini games can be experienced standalone as well as integrated both in fully web or native mobile App. The mini games' mechanics have been designed according to reusability and portability principles so that with a few mini games it is actually possible to address several STEM topics, simply authoring their configuration. It is possible to change the content of the mini games to generate game challenges suitable for a huge number of scenarios (training, learning, events management, onboarding processes). Mini games are exploitable at their best if played not as standalone but inside a meta-game session. Each mini game is able to provide feedback regarding the achievements of the game session; thanks to this the caller game can make decisions regarding the next steps in the overall experience.	Skills acquisition takes time and demands diligence, but it doesn't have to be boring.	Students, including those with learning difficulties.	Supporting task mastery with gaming activities to reduce perceived cognitive load. Introducing learning activities into geolocation games.	Educational Service Providers, including public and private administration; Parents.	Free, as a part of GLPs, unless a marketplace of minigames is established for which minigame registration and launch must be published (see D4.1).	Language translation if the students do not speak any English.	None	GLP. Minigames can only be called as a part of a GLP.	Serious games is a mature market with countless examples freely available (eg. kahoot.com). However, blending serious games with learning activities via a gamified learning design (GLP) is a novelty that may promote the use of serious games in formal education.

Title	Description	Transformative Purpose	Target Audience	Value Proposition	Target Customer	Monetization	Need for Localization	Need for Training	Dependencies	Market Dynamics
Geolocation games	An innovative way to use mini games is to integrate them as short and engaging challenges part of a location based game. Mini games that take advantage of our geolocation components further offer opportunities to create blended learning environments that are self-enriching, accessible anywhere and anytime.	Extending the learning experience out of the classroom, to the real world.	Students, including those with learning difficulties. Employees or fresh recruits for orientation and initial training.	Promoting transfer of learning as well as making learning more relevant to daily life and surroundings.	Educational Service Providers, including public and private administration; Clubs; Foundations that support either next gen education or regional awareness, reconnaissance Parents.	Potential to be sold to enterprises and regional bodies for orienting or training purposes. Possible sales to foundations to help promote their purposes.	Language translation if not all the users speak any English. PLUS, local landmarks, or beacon networks must be entered into the system.	None	Local landmarks, beacon service providers or QR codes on check points.	Emerging: There is a growing demand and few offerings are available.
Beacons configuration application	The beacons configuration application allows the: • Creation and configuration of beacons within a tool • Creation of QR codes – each beacon can be replaced with QR code • Adding area plan which will help to organize beacons in area in which teacher uses them • Organization and management of beacon groups within platform • Attaching beacons to groups and places when used outdoors	Enable ambient intelligence and location based (educational) services by letting the physical world sense the living.	Local administration	An infrastructure investment that would activate a growing number of location-based (educational) services.	Enterprises, regional administration and schools, campuses.	Depending on the business model, can be free to monetize later on application offerings OR if most offerings are freemium, the institution can be charged for this setup OR later maintenance service costs.	Language translation if configuration tool users do not speak any English.	Minimal. Users can follow guideline documentation themselves.	Beaconing service provider back-end.	Emerging: There is a growing demand and few offerings are available.
Beacon games	Using beacons for the creation of innovative gamified lesson plans allows the teachers to incorporate location based activities within buildings where GPS positioning would likely not work. This includes buildings within the school premises but also other locations such as libraries, museums and other landmarks where the students can work either individually or in groups.	Extending the learning experience out of the classroom, to the real world.	Students, including those with learning difficulties. Employees, fresh recruits or customers for orientation and initial training.	Promoting transfer of learning as well as making learning more relevant to daily life and surroundings.	Educational Service Providers, including public and private administration; Clubs; Establishments such as libraries, museums. Foundations that support either next gen education or regional awareness, reconnaissance Parents.	Potential to be sold to enterprises and regional bodies for orienting or training purposes. Possible sales to foundations to help promote their purposes.	Language translation if not all the users speak any English. PLUS, QR codes or beacon networks must be available.	None	Local landmarks, beacon service providers or QR codes on check points.	Emerging: There is a growing demand and few offerings are available.

Title	Description	Transformative Purpose	Target Audience	Value Proposition	Target Customer	Monetization	Need for Localization	Need for Training	Dependencies	Market Dynamics
Cyber physical system for the mixed reality learning, e.g. stone cutting (or other skill based jobs)	A cyber-physical system can comprise of commercial of the shelf systems (COTS) or in combination with in house developed sensing technology. These may be tethered or wireless depending on the application domain. Typically, a sensing setup will include IMU sensors, some communications protocol and an interactive interface. It can communicate with and across various devices including beacons, which make this highly versatile across formal, informal and workplace learning. An exemplar for vocational education training (VET) is the reverse engineered grinder with vibratory feedback, and Microsoft Hololens based augmented realty learning environment for stone masonry. The VET GLP was developed to provide near realistic training for stone masons. Although the system is currently being piloted to construction domain the concept and the system components are carefully designed to be generic. Therefore, it is applicable multiple disciplines involving highly skilled jobs require physical, complex, high dexterity and safety critical tasks.	Training in a safe environment; Safety no more critical for training highly skilled workers for hazardous jobs; Extending learning, training and upskilling beyond classroom; real-world experiential learning; cognitive, visceral and somatosensory mapping.	Trainees, apprentices, expert refresh, induction and orienteering	Relieving safety concerns; Connecting theory with real-world	Vocational schools, enterprises, industrial simulation learning, systems situation awareness	Develop on order.	Language	None	Physical system properties constrain the learning software	Simulation-based learning is a undergoing a transformation with the introduction of affordable AR/VR tech.
Accessabar	A unique toolset to enable people with a wide range of disabilities to access Beaconing content across multiple browsers in multiple languages. Functionalities include Speech input and output in multiple languages, magnification & rapid colour adjustments according to individual needs, all within one application. Accessabar can be embedded into the platform itself rather than being a separate software tool.	Improve usability for all types of users	Web users with disabilities.	Broadening the user base and market penetration	(Educational) web application providers	Unlikely unless the web application provider has a growing base of users with disabilities or directly target users with disabilities.	None, unless the web application have specific demands.	None.	Web application framework.	Regulations for setting a standard on accessibility is increasingly endorsed.

Title	Description	Transformative Purpose	Target Audience	Value Proposition	Target Customer	Monetization	Need for Localization	Need for Training	Dependencies	Market Dynamics
Continual Assessment	Assessment at discrete points in time suffers from not only reliability issues (eg. excited test subjects) but also narrowness of the test scope (due to limited time). Performance based assessment during games has the potential to reveal general competencies and a more holistic view esp. in STEM education. If the games take place in the digital domain, data collected during the activities can be used as evidences and help build a model for the competency states for learners continually.	Experiential learning can be assessed without disrupting the learning process	Students and trainees	Performance-based assessment	Educational Service Providers, including public and private administration; Parents.	Open source, free license software. Advanced analytics and visualization may be developed later and a freemium model can be offered.	None	None, accept for authoring dependencies	Competency tags, evidence definitions during authoring	Experiential learning is the largest trend in education nowadays. However, assessment during performance is a hard problem. A rigorous but practical solution would be a hit, but even a heuristic but practical solution would be very valuable.
Game Learning Analytics	Assessment in games with explicit questions to the students at discrete points in time suffers from not only reliability issues (eg. excited test subjects) but also narrowness of the test scope (due to limited time) and breaks the gameplay. Data-driven performance based assessment during games has the potential to reveal general competencies and a more holistic view esp. in STEM education. If the games take place in the digital domain, data collected during the activities can be used as evidences and help build a model for the competency states for learners continually. This analytics will provide a general view to the trainer or teacher of what is happening in a class or group when they are playing the game.		Teachers, trainers, game developers and educational designers of game experiences. It also provide services to students and trainees but if meditated and provided by the game itself	Data-driven performance-based assessment	Teachers and trainers; Educational Service Providers, including public and private administration; Educational researchers and educational game designers; Parents.	Open source, free license software. Code already available at GitHub. Advanced game-dependent analytics and visualization may be developed later and a freemium model can be offered. Game Analytics as a service can be offered based on this module	Some of the visualisations could require minimum localization (e.g. table labels)	Minimal once that the game has been configured and linked with the analytics. Users can follow guideline documentation themselves.	Game-dependent analytics and visualizations are dependent of the games themselves. Dependent of the competency tags, evidence definitions during authoring and the definition of the Learning Analytics Model	Experiential learning is one of the largest trend in education nowadays. However, assessment during performance is a hard problem and currently there is not wide accepted solution for a range type of games. A rigorous but practical solution would be a hit, but even a heuristic but practical solution would be very valuable.