REPAIR

Using Badges to Increase Railway Sustainability

REPAIR supports the Sustainable Development Goals

Projektkonsortium „REPAIR"
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INTELLECTUAL OUTPUT 5

REPAIR ANALYSIS

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Project Partners

UIC INTERNATIONAL UNION OF RAILWAYS	adif	fh st. pölten	RECONNAÎTRE	IPS	Slovenske železnice
France	Spain	Austria	France	Austria	Slovenia

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1 ABSTRACT

The REPAIR project examined how the concept of Open Recognition can be used to support SDG-related activities within the railway sector. In the process of the project, concepts and prototypes of Open Recognition Systems were tested and discussed with potential communities of practice in the railway sector. Along this process, quantitative and qualitative data was collected from participants and potential users. Data was analyzed and an IOOI-model was developed. This document presents the empirical evidence within the framework of the impact model. It points out pre-requirements and assumptions. It concludes with implications and recommendations for the use of Open Recognition Systems like Digital Badges to promote SDG-related activities in organizations.

Following hypotheses that the consortium came up with during the project were confirmed so far:

- SDG-related Digital Badges can be inspiration to start a conversation about SDGs, to think about a certain issue or try out new SDG related practices.
- SDG-related Digital Badges have the potential to create more awareness towards the SDGs and make those who are engaged for them visible.
- SDG-related Digital Badges lead to a higher motivation towards SDG-related engagement.
- SDG-related Digital Badges are being associated with a higher commitment of putting claims into action.
- SDG-related Digital Badges facilitate finding other like-minded peers in working for the SDGs.
- SDG-related Digital Badges are an attractive way to get recognized for SDG-related engagement.
- SDG-related Digital Badges have the potential to create a higher sense of belonging to an organization or to a specific group of people within the organization.
- SDG-related Digital Badges have the potential to support the dynamics of Communities of Practice, mainly by feeding into Social Capital and Recognition aspects.
- SDG-related Digital Badges have the potential to support organizations in their progress on the SDG Adoption Maturity Matrix, mainly on the levels of "Awareness Raising" and "Experimenting". Higher level like "Transformation" need other significant top-down policy amendments.

2 OBJECTIVES OF THIS DOCUMENT

This document aims to sum up the findings and recommendations of the REPAIR project on how to use Open Recognition (as an abstract concept) and Digital Badges (as a concrete tool) to promote SDG-related activities within railways organizations.

This document is not about protocolling the process within the project, but to sum up the findings, overall. This way, this document has the aim of being of high practical value to those who want to promote SDG-related activities using Digital Badges in their organization.

Working on impact-related – or rather outcome-targeted – projects, an iterative process is most used and promising. Iteration means a lot of back and forth, reviewing and rethinking. All of this was the case for the REPAIR project. Assumptions – as the base of the project and its steps forward – were permanently tested and sometimes needed to be dismissed. However, this document does not aim to show all re-runs and detours we took in detail. It rather focuses on describing the goal that we reached and how we got there.

The aim of IO5 is to produce an evidence-based document describing the potential, limitations, strengths, and weaknesses of SDG-related digital badges, and feed into the White Paper. The central questions of this paper are: How can digital badges be used to promote the SDGs in the rail sector? What is their potential impact? And what are the prerequisites for their implementation?

The answers are derived from empirical field studies with employees in railway organizations. The results were used to construct an impact model. They are also presented along this resulting model. Also, the results are put into perspective with their potential role for supporting dynamics of Communities of Practice and for supporting progress on the SDG Adoption Maturity Matrix.

3   METHODOLOGICAL OVERVIEW

3.1   Data collection and analysis

To answer the key questions "How can digital badges be used to promote the SDGs in the rail sector? What is their potential impact? And what are the prerequisites for their implementation?", the consortium chose a methodological approach to data collection inspired by design thinking. In this approach, development and data collection are an iterative process (see also IO1). We opted for a mixed method design of qualitative and quantitative approaches, including workshops, qualitative interviews, and quantitative surveys. This process was linked to the intention that data collection should start small within the consortium and gradually expand the scale of people involved. In total, data was collected from approximately 740 people in different professions, different communities of practice and two different countries (Spain and Slovenia).

3.2   Mixed-method design of qualitative* and quantitative° approaches
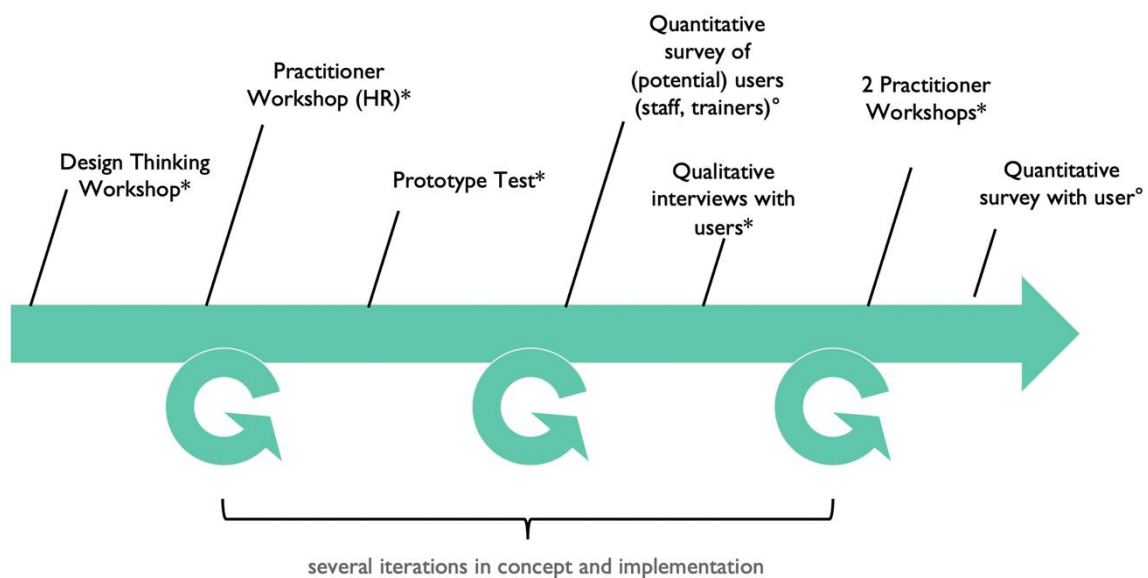
Figure 1: Design of Data Collection

Data collection began with a design thinking workshop (along the principles of Plattner et al 2012) within the consortium, where the project team was empathizing with the topic recognition for SDG-related activities, defined problems, generated ideas and created prototypes. The results of this first workshop formed the basis for a practical workshop with HR managers (invited by UIC) where we presented our ideas and gathered feedback. In addition, the HR managers developed their own ideas regarding the potential of SDG-related digital badges. Based on this feedback, the first digital prototype was developed via the Badge platform Open Badge Factory and HumHub. Prototype test interviews were conducted within the consortium. While working on a new technological solution, the Quantitative Worker and Trainer Survey (see Annex I) was sent to all employees of Slovenske železnice which have a work email address (about 2.500 employees). 474 employees (19% of all Slovenian Railways employees with an email address) gave us important insights into their awareness regarding the

SDGs, what kind of SDG-related practices they integrate into their work and how these practices are recognized in their organization. In addition, 70 Spanish and 15 Slovenian trainers responded to the questionnaire and shared their insights on SDG-related activities within the organization. The Slovenian and Spanish railways organized trainer workshops to inform on the SDGs and introduce the idea of badges. A few weeks later, 20 qualitative interviews with trainer were conducted with the aim of providing feedback on the experience of applying for and using a badge as well as assessing the potential of SDG-related digital badges

In parallel, a survey was sent to RSi contributors. The aim of this survey was to capture the idea of linking RSi and SDG-related digital badges. Due to the difficulty of reaching RSi managers, too few people completed the questionnaire to evaluate it quantitatively. This was compensated by involving them in workshops at the RSi conference. At the RSi conference in Paris, the idea of badges was presented to about 43 international sustainability experts who attended the conference. The potential of SDG-related digital badges was discussed, and new badges were developed in a World Café setting. The same workshop format was repeated in Madrid at the dissemination event, attended by about 16 trainers, managers, and security experts of Adif. Close to the end of the project, the Quantitative User Survey (see Annex III) was sent out to people familiar with the concept of digital badges to get an assessment of the potential of digital badges in the context of SDGs.

Method	Participants/ Responses	Purpose
Design thinking workshop	10	Understanding the potential of SDG-related badges
Practitioner HR workshop	approx. 50	Understanding the requirements of SDG-related badges
Prototype test (qualitative)	7	Testing a first prototype
Quantitative Worker Survey: Slovenian Railways	474	Measuring the Awareness Level of SDGs and the Recognition practice for SDG related activities in the organization.
Quantitative Trainer Survey	100	
Qualitative user interviews	20	Feedback on the new prototype and the idea of SDG related digital badges.
2 practitioner workshops	approx. 60	Selecting ideas of SDG-related digital badges, testing the acceptance of SDG-related badges
Quantitative user survey	23	Measuring the impact potential of SDG-related digital badges and the acceptance of the 2nd prototype.
n =	approx. 740	

In general, the Covid-19 measures had an impact on the data collection methods in the first half of the project. While the first two workshops could only take place online and were adapted accordingly, the last two workshops could take place offline again.

4 IMPACT MODEL - OVERVIEW

All this data was used to develop an impact model showing the potential of SDG-related badges in the rail sector. The impact model corresponds to an IOOI model (Input – Output – Outcome – Impact) and is based on the structure of the Social Reporting Standard (Kurz, Kubek 2017). Effects are changes in the target group, in their living environment or in society. The effect on society is called impact, the effect on the target groups is called outcome. Outputs are the measures and activities implemented to achieve the effects; inputs are the resources used.

The impact aim of the REPAIR project was to "mobilis[e] the collective intelligence of the workforce as curators of the information used to create real time occupational maps 'à la manière de' Open Street Map: a bottom-up framework mapping of practices to help students, citizens, employees, employers and public authorities to make informed decisions regarding learning and career paths." By applying this principle to SDG related practices, competencies and activities, REPAIR used the concept of Open Recognition and Digital Badges (MIRVA 2020) to "raise the awareness on the responsibility of and the opportunity for companies and workers to achieve the United Nations Sustainable Development Goals."

Using techniques of the Theory of Change process (eg. backwards mapping, assumption testing), the impact model was developed, tested with different stakeholder groups, and iterated multiple times. The result is a two-fold impact model that is shown below in an "overview version" and is to be detailed in the further course of the document.

*Figure 2: **Overview of the Impact Model***

It proved to be essential to consider both employees and the organization in the impact model. Although, a bottom-up approach is at the core of the idea of the project, practice shows that a one-sided look does not suffice. For example, bottom-up approaches need to be at least tolerated and not sanctioned to be able to emerge. Further, bottom-up approaches can be fostered informally by adequate leadership and culture but can also be killed by inadequate leadership and culture. Going further, bottom-up initiatives can also be supported formally by providing an innovation-friendly atmosphere. Lastly, when financial incentives are given to bottom-up initiatives – there comes already a quite strong side-taste of "top-down" in play. On

the other hand, the more and the more relevant bottom-up initiatives there are, the higher is the benefit for the organization and its readiness to foster such initiatives. So, outcomes on employees and organization are highly interdependent – you can't think one without the other. This is, why the impact model is two-fold.

Following investments as inputs, the major output is to be called into existence: employees that use Digital Badges (as a means for Open Recognition) to promote, inspire and ignite SDG-related activities in the organization. This means, employees use badges to show their own practices and competencies related to SDGs, look for other like-minded people in the digital universe of within a company or beyond, and hence, create a platform, boasting with talent and engaged people wanting to promote SDGs within their company.

Considering this done, a series of changes are expected to take place. By moving around and taking part in such an eco-system, employees are expected to increase their awareness and knowledge around SDG-related practices. Consequently, they also increase their level of actual activity targeted towards SDGs, and/or promote more activities. Eventually, employees benefit from these practices: They have risen their level of skills and experience, but also their level of satisfaction at work, as they are able to do what they have a genuine interest for and/or something that is undoubtedly considered meaningful.

On the other side, the organization runs through several transformations as well. Having an ecosystem as described above, organizations have a higher awareness of the skills and competencies of their staff, but also of their interests, ideas, and practices. This allows organizations to deploy their staff more adequately and therefore more effectively. Having a closer look at staff and what drives them, also will bring new ideas into the organization and possibly into realization. The latter even better with engaged employees who can bring in all their talent and passion. Eventually, this results in a higher competitiveness for the organization – not only on product and service markets, but also on the labor market as an attractive employer.

Eventually, on the impact level this results in an improved "awareness on the responsibility of and the opportunity for companies and workers to achieve the United Nations Sustainable Development Goals" (Impact goal of the project, see above).

5   OUTPUTS – IN DETAIL

Following investments as inputs, three critical output components are to be called into existence: the implementation of a Digital Badge system (as a tool for Open Recognition), but also the implementation of policies and processes that prioritize SDG-related activities and promote the concept of (digital) Open Recognition.
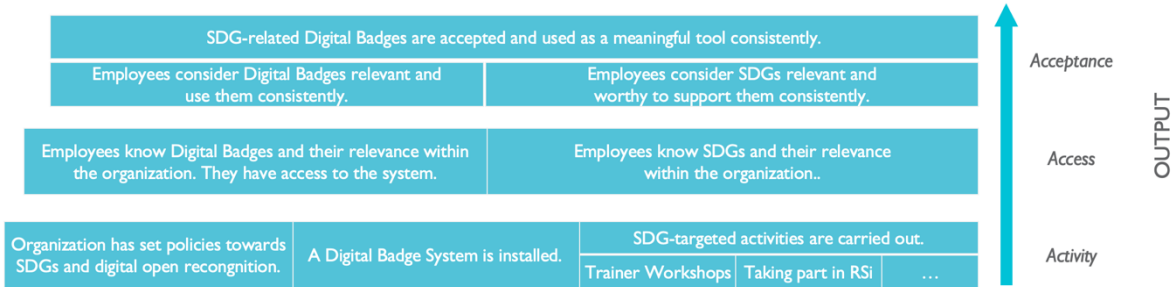
While the first factor is rather obvious, the other two factors particularly emerged to be essential listening to the respondents of qualitative and quantitative questionings.

5.1 Output Level 1 / Activities

5.1.1 Organization has set policies towards SDGs and digital open recognition.

Qualitative data shows that an organizational change towards an SDG-targeted organization must be anchored in the organizational goals, in its strategy and in its culture. It's not enough to install technical systems and rely on bottom-up motivation to use those systems exactly as intended.

As already stated in the results of the prototype test (Angerer/Bauernfeind 2022), one of the central preconditions can be summed up as a kind of anchoring of a digital badge system in an organization: "Corporate culture needs to be integrated with the use and purpose of digital badges. The latter may be manyfold, and the decision what purpose the organization is aiming at with the use of badges is crucial: An organization aiming at an open exchange culture of experiences with a badge system is probably very different from an organization which prioritizes a competition of knowledge and achievements among its staff using the badge system. So, in the case of the REPAIR project, the purpose of using badges is to promote the SDGs. So, besides the knowledge of using badges, a knowledge of the purpose as such and about the value of the purpose is needed."

While the naming of "Open Badges" and "Open Recognition" implies and emphasizes bottom-up approaches and the concept of emergence, the most frequently uttered precondition is pretty "top-down". It is about the necessity of a formally implemented organizational strategy that gives both – digital recognition and the promotion of SDGs – sufficient weight, relevancy, and importance for both concepts to be adopted by staff.

Especially HR practitioners stress the point of the importance of "*leadership*" in tackling this "*change management challenge*" that needs to just happen from "*top down*". However, also a trainer states in the interview: "*I see a big role of Director/Head of Department here.* "

The organizations' culture and innovation policy need to be designed to be able and to foster bottom-up approaches like peer-to-peer recognition and following own ideas. As one respondent out of HR puts it into words: "*[An important] barrier – if there is not a culture of recognition yet.*" In other words: It doesn't make sense to install an innovative, open, peer-to-peer digital recognition system, if there is not a lived and experienced culture of claiming, giving, and receiving recognition. Establishing this culture of recognition is a completely different cup than installing a digital tool for it. Another HR manager comments on the necessity of the "*acceptance of change and new ideas*" within an organization, one further comment bother about the importance of being prepared for "*unplanned bottom-up changes*". Why bother to install an open recognition system that promotes new ideas and unexpected practices, if the organization is not ready for it?

On the other hand, also the orientation of an organization's strategy towards the SDGs needs to be defined, communicated, and lived up to. However, in our interviews, staff's respondents refer to the fact that they have not yet noticed that the SDGs play an important role in the organization. Consequently, they don't see the approach of using digital badges to promote the SDGs as a consistent one. Various insights in interviews and comments are like the following

ones: "*That would be possible if [this] would be promoted and recognized by the company.", "In theory it could work but it has to be backed by the company.", "They would if the system was implemented and encouraged in the organization.*"

As soon, as recognition and the SDGs are properly installed in the organization's strategy, a Digital Badge also has the potential to receive the adequate value and will be perceived as something valuable. As various respondents put it: "*The company [needs to] properly value the badges.", "Badges need to be recognized and valued by the company itself. It must be avoided that they simply serve as a feel-good of the company's staff.*" or "*You have to give the badge some weight so that it is actually useful.*" It becomes clear that the idea of peer-to-peer recognition for the sake of itself does not convince the respondents in the test field.

A clear indicator if something is valued or not within a system are incentives that come with it. Various respondents refer to the importance of incentives that are clearly communicated in a "If-then-logic" – or put in other words: Employees need to know what is in it for them if they earn a badge. Some respondents stay pretty vague about it ("*If […] you could use it for something, employees would be much more motivated.*"; "*We should promote the activities with external stimulus.*"), others are quite specific ("*Motivation does not come from the badge, but from some prize that can be offered, for example, a trip or something like that.*"; "*Like financial incentives or a reward system.*")

Recognition itself as a benefit seems to be sufficient on a meta-level or on the level of conceptualizing the idea. Looking at the concrete feedback, one must reflect on this thinking of it being too wishful.

Internal communication and marketing are seen as critical for a successful implementation of badge system to promote the SDGs. Again, the need for communication and marketing is seen for both digital badges and SDGs. Obviously, both need to be anchored in the organizations' strategy before being able to be communicated. This simply means promoting the use of digital badges and SDG-related activities within the company. Various respondents suggested to implement an incentive system or internal competitions for this cause.

5.1.2   A Digital Badge System is installed.

At this level of output, it is not only about a Digital Badge System to be installed, but also the qualities this system is ought to have, to be accepted and used. Obviously, the right kind of user experience is needed. Unsurprisingly, respondents talk about a process to claim badges that "*involve little effort, and […] is natural and simple.*" or that "*looks like fun!*" One respondent says that he still sees a long way to go until badge systems have reached an adequate level of convenience.

Some responses on the design of a badge system that is incorporated in a company refer rather to the conceptual design than the actual user experience of a software. Various responses talk about the necessity to integrate the thinking of SDG goals, SDG activities and badges *within one system*. This means for the company having a clear idea what SDG improvement it would like to see, what activities are needed for that and design the needed digital badges accordingly.

During the projects, various types of possible badges emerged:

- **Aspirational badges vs. badges about accomplishments:** Aspirational badges would claim a future wish or interest ("working for fulfilment of SDG 8"). Badges about accomplishments would be about past successes ("reached SDG 8"). These badges would

serve different purposes. Aspirational badges would rather support people to find like-minded others, while badges with accomplishments would be a sort of award that would spark recognition. However, they can also signal to others that its owner is ready to share experiences, knowledge, and inspiration. This way, aspirational badges and badges about accomplishments could be supplementing each other.

- **Badges that are awarded vs. badges that are claimed by users themselves:** The project discussed in different formats how open inclusive or exclusive badges should be awarded. If badges are awarded for certain exceptional achievements, they have a higher exclusivity value and the achievement for which they are honored can be verified by others. The downside is that this exclusivity makes it harder for workers to be part of a movement to promote the SDGs. However, if badges can be claimed by employees themselves, there is no verification mechanism to prove it. This means that anyone can claim to promote the SDGs without having to provide evidence. This makes badges arbitrary and inflationary. The advantage of the latter option is that badges have a mobilizing effect and could raise awareness of the SDGs in general through their wider reach. Everybody could be a changemaker, everybody could be part of a community supporting the SDGs. To get the best out of both approaches, different types of badges can be used or combined: those that are awarded as a tribute and those that are claimed to simply express one's efforts in relation to the SDGs.

- **Badges for qualifications vs. badges for practices:** In many companies, badges are awarded for certain competencies. For example, after completing a seminar or further training. This makes the acquired skills visible. However, imparting knowledge in the context of courses does not show the extent to which this knowledge is applied in everyday work and thus also solidifies and expands. We learn and acquire most skills through practical activities that are not directly taught in courses, but are acquired in our daily work. These practices and practical skills usually remain invisible and difficult to name. The aim of the SDG-related digital badges could also be to make the invisible SDG-related practices visible. For example, in locomotive driver training, drivers learn how to steer the train efficiently and in a way that saves resources. A qualifications-related badge would show that a driver has finished this training, but it would not show whether the train driver actually pays attention to energy-efficiency in his everyday work or whether resource-saving control is important to him. For the actual practice and the application of skills, a badge for practices is needed. In the REPAIR testbed, the RSi index was associated with a potential "badge of practice": stating exactly what practice led to a specifically high RSi score ("*to link badges directly to the practices that led to high RSi scores*" and this way, to identify "*practices [...] that proved to be supportive of good sustainability performance or a high RSi score*").

- **Spheres of validity**: Digital Badges can have different spheres of visibility but also validity. Especially, badges that are awarded by specific instances of the organization (e.g., training center) are likely to also have external validity, for example to prove that a person has received certain training. Other badges, like for sustainable practices, might only be of value within an organization that has set its priorities accordingly. For example, a badge documenting sustainable printing practices within the office might be of high value within a sustainable company, but of no value for a company who doesn't care about these values.

- **Multi-level badges (beginner, advanced, pro):** Of course, badges can have different levels or thresholds. Badges can be applied for an attitude or value at a beginner level,

or they can be officially awarded after reaching an ambitious goal. As an example, in the Repair Project the SDG Awareness badges were available to apply after the trainer workshops.

- **Organizational badges vs. individual badges:** Badges are usually used to demonstrate practices, skills, and competences of individuals. In contrast, badges can also be claimed by teams or organisations. While the individual badge increases self-motivation or represents individual practices and values, a team or organisational badge can increase identification with the organisation or the sense of belonging to the team.
- **User-created badges:** Above all, badges can also be open for users to create them themselves. This means, users are not dependents that there is the right badge for them up for offer. In contrary, they are able to create their own badges and put them in a public library. If others feel like claiming it, they can claim it from there.

5.1.3 SDG-targeted activities are carried out.

As a consequence of an organizations' policies (see 5.1.1), the claimed strategic goal and purpose also must be lived up to within the organization. This means, it becomes evident to staff, partners, clients, and customers that specific SDGs have a high relevancy in the organization and adequate activities are being carried out. During the REPAIR testbed, the focus was on two SDG-targeted activities that got implemented: a trainers' seminar on SDGs, what they are and how to contribute to them was developed and carried out. Furthermore, the RSi Index was used as a prototype project that offered the opportunity to also claim a badge.

To measure the effect of the trainer workshop, a quantitative online questionnaire was sent to the participants before and after it. The results showed that the workshop raised the awareness regarding the SDGs, trainers rate the SDG-related activities of their company more highly, they have more awareness of their own capacities to contribute to the SDGs and the SDGs are taken more into account in their daily practice. This workshop format could be easily implemented and is a good method to spread the idea of SDG-related digital badges. Combining these workshops with knowledge how to use digital badges the potential of a "*big impact*" is seen by respondents.

Slovenian-Trainer survey: before and after the workshop	BEFORE THE WORKSHOP	AFTER THE WORKSHOP
SDG-AWARENESS	87%	93%
Awareness of company's SDG-activities	62%	92%
Awareness of own capacity (self-efficacy) to contribute to SDGs	33%	60%
Recognition of SDG-related practices	0%	28%

Interested in getting more information about the SDGs	67%	80%
Awareness of contributing to one or more of the seven selected SDGs.	43%	73%
N= 15		

The Railway Sustainability Index (RSi) was used as a concrete project or intervention. The RSi was well known within the UIC network, it was also well accepted. Participants understood what the RSi was about and how to participate in it.

The International Railway Association (UIC) has chosen to address 7 of the 17 UN's Sustainable Development Goals with the RSi. These are Gender Equality; Affordable and Clean Energy; Decent Work and Economic Growth; Industry, Innovation and Infrastructure; Sustainable Cities and Communities; Responsible Consumption and Production; and Climate action. To ensure connectivity within the Repair Project with the RSi, it was decided to select these 7 goals when creating the badges and focus on them when conducting the surveys and interviews.

5.2 Output Level 2 / Access

5.2.1.1 Information and Knowledge on Digital Recognition Systems

A critical factor that might seem obvious – but isn't – is the simple knowledge of Digital Recognition Systems like the Digital Badges are: Along the whole course of the project and on every occasion, we got to learn that the concept and tools of Digital Badges are simply unknown. The majority of respondents have not made contact with Digital Badges before getting in touch with the REPAIR project and its testbeds at Adif and Slovenske železnice.

Quantitative results showed that only 9 of 23 respondents in the quantitative user survey have ever claimed a digital badge themselves. Only 2 of 23 respondents said, they are "quite familiar" with the concept of digital badges. However, 13 of 23 respondents have not had any experience at all with digital badges apart from the REPAIR project.

In face-to-face talks and workshops already early in the project, it became clear that many representatives of participating organizations have not had any experience with the concept. More than once, it occurred to us that digital badges were understood as analogue badges that are thought to be worn as part of the uniform or individual outfit. That is why certain formats for the basic and general induction of participants into the matter of digital badges, what they are about and what to do with them, have been developed. Also, qualitative findings show that the simple knowledge on exact these questions are seen as critical for any digital recognition system like a badge system to work: *"The problem is unfamiliarity with the badge system."* or *"I am afraid that not a lot of people know about badges."* At the same time, the adequate knowledge transfer in this respect is seen as a critical, but do-able job and prerequisite, to fulfil its potential to promote the SDGs: *"They would, if they know more about [how badges work]. And if they would internalize the importance of the SDGs."* or *"I think badges can have a strong impact on spreading awareness about sustainable development as they are a concrete proof of involvement in an activity, a confirmation that you are doing good. If people in the rail sector were aware of this, they would be more likely to use badges."* One respondent put quite clear that it is not only about practical aspects of digital badges but the philosophy behind it: *"[…] if people have internalized the very concept of essence of the badge, not the fact that you own it, but by the idea behind it."*

5.2.1.2 Information and Knowledge on SDGs and their implementation

As it becomes evident, the necessity of awareness and knowledge also applies to the SDGs themselves. The surveys carried out in this project show that knowledge on SDGs has the potential to be a lot higher: In the quantitative Slovenian survey (see Annex I), only 8% say, that they can name specific SDGs targets. Even though 40% agree, that they have already heard of them, most (44%) of the workers have never heard of the SDGs at all.

Have you heard about the United Nations' Sustainable Development Goals (SDGs) before? (n= 474)

	0%	25%	50%	75%	100%
Slovenian employees (n= 474)	8.0%	39.8%	8.6%	43.7%	
Spanish and Slovenian trainer (n= 103)	41.7%	44.7%	1.9%	1.7%	

- ■ Yes, and I can name some of the goals.
- ■ Yes, but I don't know about them in detail.
- ■ I don't know
- ■ No
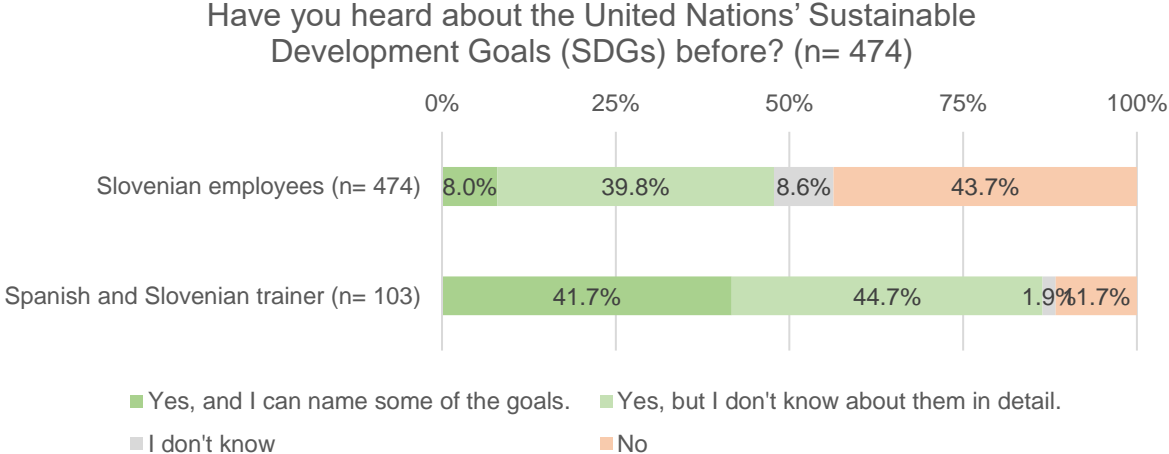
Figure 4: SDG-Awareness

While worker on the operational level (conductor, train driver...) have a lower awareness level (6% can name specific SDGS), the manager, designer, and researcher group are more aware (8%), and directors have the highest-level regarding SDGs. In this group, 14% can name specific goals. This is particularly important because this group is the most likely to facilitate and support awareness-raising activities on the SDGs. Nevertheless, it is at this level that awareness-raising measures need to start, because even in this group, more than half (55%) said they had never heard of the SDGs.

Luckily, the Spanish and Slovenian trainers are more aware of the SDGs. In this group, 42% say they can name individual SDG targets and another 45% claim they have already heard of them.

Those employees who answered that they are aware of SDGs were asked, how they would qualify the engagement of the Organization to help achieve the SDGs. Only 5% think that their national railway organization is strongly engaged and about half (49%) believe that the engagement is good but could be improved.

How would you qualify the engagement of Slovenske železnice to help achieve the SDGs? (n= 219)

0%	25%	50%	75%	100%
4.6%	49.3%	13.7%	28.8%	3.7%

- ■ Strong
- ■ Good but could be improved
- ■ I don't know
- ■ Weak
- ■ Inexistent

Figure 5: The organizations' engagement to achieving the SDGs.

In this sense, there is room for improvement for the national railway becoming a more SDG-oriented organization. However, the trainer workshops showed, that the participants were more aware about the organizations' SDG-related activities after the workshop than before. In sum, 36% of the Spanish and Slovenian trainer qualify the engagement of their national railways as "strong".
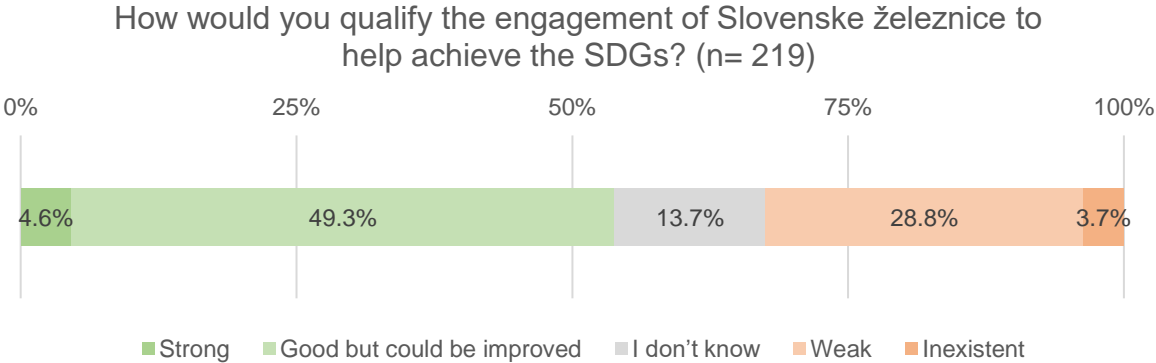
5.3   Output Level 3 / Acceptance

5.3.1   SDG-related Digital Badges are accepted and used as a meaningful tool consistently.

The overall goal of acceptance is that employees accept SDG-related Digital Badges as a meaningful tool and use it consistently. This results in two critical pre-requisites: The Digital Badge System as a technical and organizational tool is being accepted and taking part in. But also, SDGs are being accepted and seen as worthwhile working towards. And after all, the combination of the two – using digital badges to work towards SDGs – is seen as meaningful.

5.3.2   Employees consider Digital Badges relevant and use them consistently.

Eventually, building up on the knowledge of a Digital Badge system and general access to it, users need to feel that this system is also meaningful, useful, and simply relevant to them. During the interviews, important assumptions derived from the prototype test (Angerer/Bauernfeind 2022) were supported. In order, to establish a sustaining and consistent acceptance and use of a Digital Badge system, the following aspects are considered to be crucial:

- a design of digital badges that ensures a relevant amount and level of detail of infor-mation (eg. showing an exact practice),
- relevant benefits from using digital badges, eg. incentives of the organization,
- central validation of the practices, competencies, etc. that are claimed with a badge,
- a motivating tonality and atmosphere throughout the whole system,
- a clear sur-value in comparison with existing systems like LinkedIn.

Various respondents came up with the argument that it needs the right composition of target group, meaning staff, for working with a digital recognition system. Young users/employees are found to be seen as more suitable than older staff: "*They have a greater predisposition for the use of new technologies and consequently digital badges.*" Furthermore, older staff is seen to be less open to further qualification by one respondent: "*Older employees who are not interested in getting new competencies. Who are only waiting to retire. I see more potential in younger generations.*" Also, one respondent says that it needs more technical knowledge-able staff to use digital badge systems.

5.3.3   Employees consider SDGs relevant and worthy to support them consistently.

As shown in the previous chapters, awareness of the SDGs is a prerequisite for promoting SDG-related activities. There is still a need to catch up here, as only 48% of employees are aware of the SDGs. After the concept of the SDGs was briefly explained, 45% of respondents would like to receive more information about the SDGs and 17% would like to know how they can contribute to the SDGs. The topic is seen as relevant by most employees.

Are you interested in getting more information about the SDGs and how you can contribute to them?

	Yes, I would like to contribute, tell me how	Yes, I would like to receive further information	It is interesting, but I'm too busy to think about it!	I'm not interested
Spanish and Slovenian Trainer (83)	33.7%	38.6%	22.9%	4.8%
Slovenian employees (339)	17.1%	44.8%	19.2%	18.9%
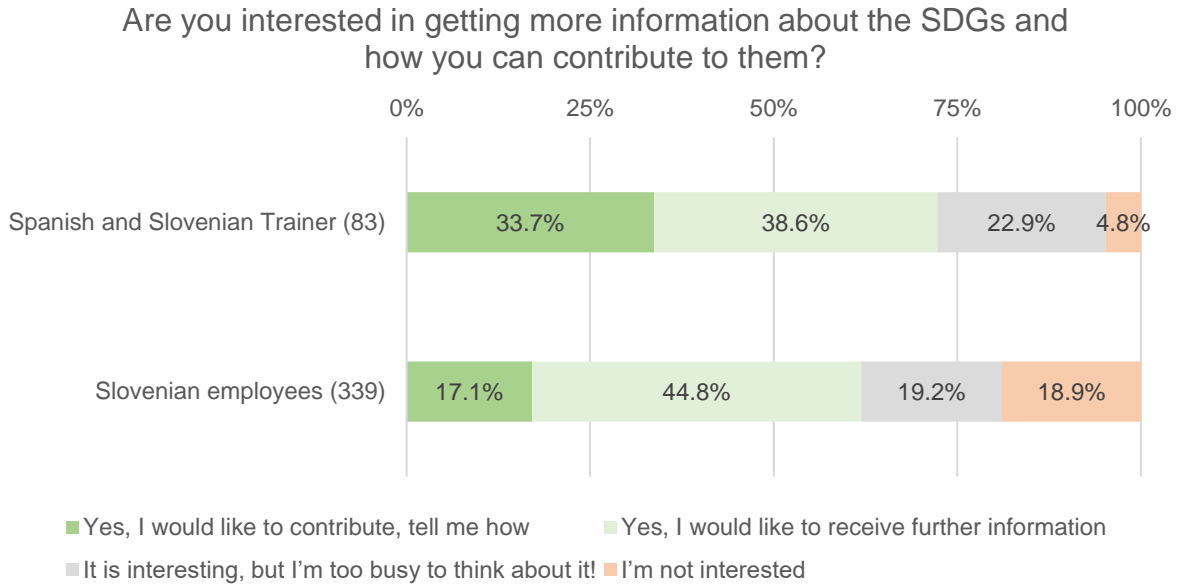
Figure 6: Interest in SDG-related information from employees in the Railway sector.

This topic is particularly relevant for trainers in the railway sector: here 33% would like to know how they can contribute and 39% would like to receive more information. Only 5% of trainers are not interested. This is also why the Slovenian Railways launched the Sustainable Trainers' badge, which has been downloaded 14 times. As the Slovenian railways employ only 15 trainers in total, this shows that the topic is of great importance to them.

Figure 7: Sustainable Trainer Badge.

However, our survey showed that even if people know about the SDGs, this does not mean that they feel able to contribute to the SDGs. Of those who said they knew about the SDGs, 62% said they could contribute to the SDGs in their work. But even if employees have this self-efficacy, it does not mean that they have a specific idea of how they can contribute to the SDGs. Unfortunately, only 18% have a concrete idea of how they could contribute to the SDGs.

Do you think that you, as a rail professional, can contribute to help achieve the SDGs in your work at Slovenske železnice? (n= 215)

| 61.9% | 25.6% | 12.6% |

■ Yes ■ I don't know. ■ No
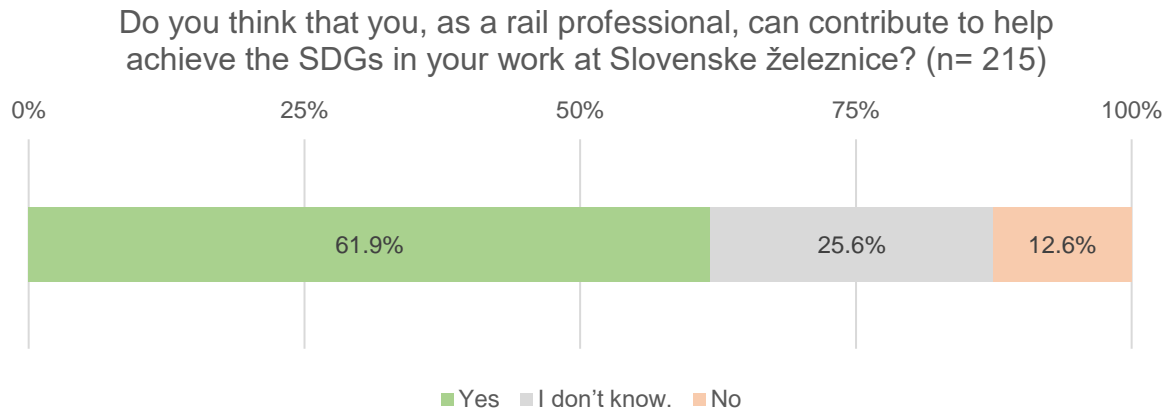
Figure 8: Awareness of own capacity (self-efficacy) to contribute to SDGs.

This shows that workshop and training formats are needed to raise awareness of the SDGs and give staff ideas on what they can contribute.

Are the SDGs taken into account in your daily practice? (n= 200)

| 15.5% | 10.5% | 22.0% | 10.5% | 41.5% |

■ Yes, I choose these daily practices on my own initiative.
■ Yes, these daily practices are assigned to me by my supervisor.
■ Yes, these daily practices are set by the company.
■ I do not know.
■ No, my job does not include SDG-related practices.
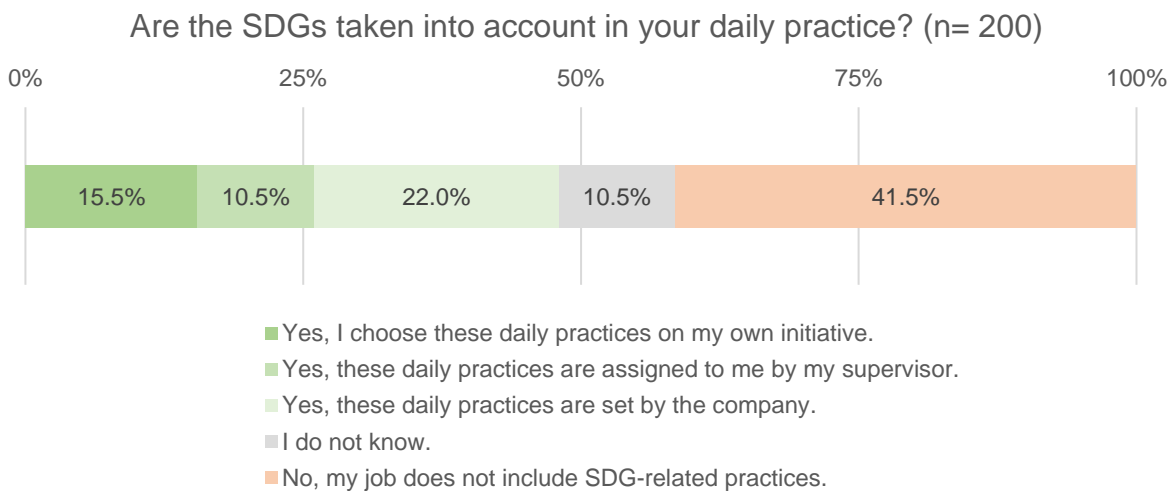
Figure 9: SDGs in the daily practice of railway workers.

Unfortunately, about half of the employees who are aware of the SDGs cannot confirm that the SDGs are taken into account in their daily practice. 22% think that the SDGs are part of their job and given by the company or assigned to them by their supervisor (11%). Only 16% choose SDG related daily practices on their own initiative. The trainers from Spain and Slovenia have a higher agreement here, 1/3 state that they choose SDG-related activities on their own initiative and only 20% see no connection to the SDGs in their work.

Do you think that you as a rail professional are already contributing to achieving one or more of these seven selected goals? (n= 116)

0%	25%	50%	75%	100%

67.2%	25.9%	6.9%

■ Yes, and this is what I'm already doing: ■ I would like to contribute, but I don't know how
■ No, rather not.
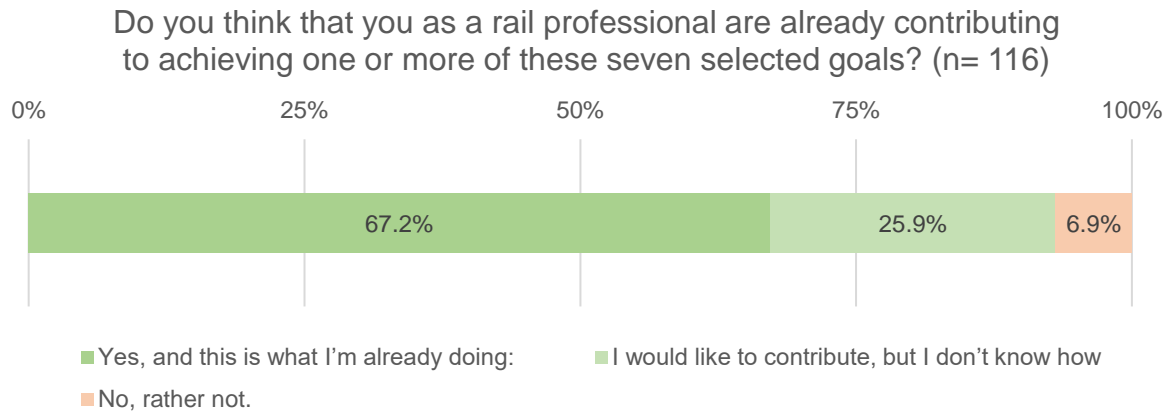
Figure 10: SDG-related Practices.

Asking those employees who are taking SDGs into account in their daily work, if they believe that they can contribute to one of the seven Goals that were selected by the RSi, 67% say, that they are already doing something specific. However only the half of them name specific activities what they already doing. The activities mentioned range from small measures that are integrated in the personal everyday life easily (less printing, reducing waste, using renewable batteries) to mindful use of energy resources in daily work practice (efficient loading of the wagons, driving the train efficient), to measures that needs changes in the organizational framework (more home office, less business travel) to larger strategic measures (supporting SDG training programmes, advocating for more gender equality in the personnel policy, awarding contracts only to SDG-compatible companies).

6 OUTCOMES // TARGET GROUP EMPLOYEES

OVERVIEW IMPACT MODEL
Target Groups: Employees

Figure 11: Impact Model // Outcomes for employees.

6.1 Outcomes Level 4: Increase of awareness of SDGs and knowledge of SDG practices.

Based on their experience with the different kinds of prototypes, participants and respondents were asked about their perspectives of possible outcomes. In the next section, qualitative interviews and the quantitative user survey are used to show what evidence there is that certain hypotheses that the consortium came up with during the project are confirmed by the test users.

6.1.1 Inspiration for working on SDGs.

The most frequently seen change that badges could bring around was seen in inspiration that is sparked if you come across someone wearing a badge. Inspiration is seen as manifold. Firstly, there is the inspiration to start a conversation: "*A badge is an invitation to get into a conversation.*" As such a conversation starter, badges are considered to be able to play an important role for also inspiring innovation: "*Badges create talking points – both within a team, a company and also to people outside the company. Therefore, badges could facilitate to spark innovation.* " One respondent also saw badges as something that could pass on or delegate inspiration to change: "*If I have an idea, but actually don't want to pursue it myself, I could share it with someone who I identified as interested in the topic. Badges can facilitate to spark innovation this way.*" Secondly, it is about the inspiration to think about a certain issue or try out new practices: "*Seeing what others are doing also encourages you to try some new practices.*" Or simply to get engaged or intensify engagement: "*You can inspire people to do and learn more.*" For one respondent, inspiration comes by the overview of different badges/practices: "*I like that we see how many options we have. Badges show us how many different practices we have in this area – what you can do to promote SDGs.*" Out of 20 trainers, the hypotheses "Badges show active practices towards the SDGs. That makes it easier to learn from/about them." was approved (rather or fully) by 11 trainers and disapproved by 7 trainers.

6.1.2 Raised awareness on SDGs.

Badges make SDGs, those who are engaged for them and how they are engaged visible. This raises awareness about all of them. This effect is clearly seen by respondents: "*Badges are a tool that reminds us of SDGs.*" Seeing other practices raise awareness on possible practices (equaling inspiration, see above). Awareness on SDGs and that the individual actually can do something about them is a critical precondition for any kind of SDG-promoting change. As such, awareness is a critical amplifier for any SDG-related engagement.

Although the sample of the quantitative user survey was rather small, it shows a clear tendency that SDG-related Digital Badges have the potential to create more awareness towards the SDGs: 85 % of respondents agreed.

As shown in 5.2, the level of awareness of the SDGs is still low. Only 8% of Slovenian railway employees can name specific SDGs. However, this is a prerequisite for the implementation of certain SDG-related activities. Therefore, awareness-raising measures are needed that ultimately also support and promote SDG-related activities and increase the number of people willing to contribute.

6.1.3 Raised motivation to work on SDGs.

Being more motivated towards SDG-related engagement, is another outcome that is frequently seen by respondents – be it in the form of initial motivation to start something new, or the motivation that keeps you going with something you started early on (*"[It] motivates you to keep going in that direction."*). Again, an adequate organizational culture is claimed to be a critical pre-requisite for people becoming more motivated: "*If people [in an organization] value SDGs and recognize that Open Badges are symbols of these values, they become more motivated to share their values and learn.*"

6.1.4 Other

Digital badges are also to be found to spur competition among staff and to build a competitive mindset. Different voices find this to be a rather positive and interesting outcome that can contribute to the innovativeness and sustainability of an organization.

6.2 Outcomes Level 5: Increase of carrying out and promoting SDG practices.

6.2.1 More committed action to SDGs

SDG-related badges are being associated with a higher commitment of putting claims into action. Various respondents articulated that claiming a badge also raises commitment to sustainable behavior. A participant brings it to the point: "*In a next step, commitment follows: "If you put on a badge, you also want to follow through." – a self-fulfilling prophecy.*" It is the public nature of displaying claims via badges that contributes to your commitment: "*If you say publicly that you do something, you feel more obliged to actually do it.*" However, again, the adequate organizational culture seems to be key for this pathway of change. If the culture of the organization is used to "empty claims" that are rather "talk than walk", then probably, an SDG-related badge would be just another empty promise. So, an organizational culture of actually meaning things as you communicate them, is key.

6.2.2 Exchange experiences, find like-minded, create a Community of Practice.

Digital Badges facilitate the finding of like-minded peers that exchange experiences and therefore create a Community of Practice. This momentum is a highly valued one, both in the overall concept of Digital Badges and in the perspectives of our respondents: "*You can find peers that have the same ideas, affiliations, hobbies and connect with them. Also get new ideas for Sustainable Development Goals activities.*"

Among the interviewed trainers, there is a broad agreement on the hypothesis "Badges facilitate to find other like-minded peers in working for the SDGs." 14 out of 20 trainers (fully or rather) agreed, 4 (fully or rather) disagreed. Less approvement is shown towards the hypothesis "With badges, employees can exchange their know-how and experiences in working towards the SDGs more easily.": 11 out of 20 trainer (fully or rather) agreed, 9 disagreed. Trainers notice precisely that exchanging know-how and experiences are already a consequence of a successfully implemented system and culture – and therefore, they show a higher skepticism towards this hypothesis.

Among respondents of the quantitative user survey, there is a clear tendency towards approving this potential: 92 % of respondents agreed that SDG-related digital badges facilitate finding like-minded peers. On the other hand, there seems to be more skepticism toward actually exchanging know-how and experiences. While 57 % agreed that SDG-related digital badges do facilitate the exchange, 14 % disagreed.

To find like-minded people helps – not only to actually exchange experiences and learnings, but also, to simply not feel lonely. Feeling lonely or simply counter normative is one of the biggest strains of innovators or people trying to establish something new (e.g. Grabher 2004, Fromhold-Eisebith 2004). Innovation incubators put a strong focus of connecting innovators with each other, providing them the feeling of eventually finding other people who don't fit in. Or as a trainer puts it: "*In life and work we are always searching for like-minded people. Badges are a great way of pointing out someone who is "wired" the same way.*" Finding like-minded people is the critical prerequisite of the feeling of belonging (see Outcome Level 6).

Digital Badges are found to be unisono a practical tool to find like-minded people: It is obvious who is interested in the same issues. Feeling certain of common talking points lowers the inhibition of getting in contact with each other. Contact is established via the same talking points and exchange of interests, experiences, and views. Or as the participants of the World Café put it: "*Badges lead to an immediate talking point – people exchange, share their stories, facilitate connection. […] They lower the threshold to get in contact with one another. [And] facilitate the sharing of ideas and foremost experiences and practices.*" As a trainer points out, this finding of like-minded people is an important need: "*I would love to get more information, knowledge and broaden my horizons by exchanging experiences with like-minded peers.*"

Especially the digital badges make it easy to find like-minded, no matter where they are physically: "*Sharing badges on social media makes it easy to show your competencies to others like-minded.*"

However, this does not only work in the digital realm. A participant told us about her experiences of wearing a lanyard at conferences that displayed her focus of work. The wearing of the lanyard led to various conversations about this topic in the "real world" of the conference.

Another participant points out that it is not only to find common interests, but also complementary interests. This would allow to even learn more or to delegate and share commitment.

6.3 Outcomes Level 6: Increase of level of skills, experience, and satisfaction at work.

6.3.1 Increased visibility for the individual

Getting and being seen is a profound human desire, which social media proved to be able to fulfil quite successfully. It is also a promise of digital badges – which is seen to be fulfilled by the majority of different respondents that we collected data from. 85 % of respondents of the quantitative user survey agreed that SDG-related badges increase the visibility of engaged employees. Ratings in the trainers' interviews are slightly lower. Approval of the hypothesis "Badges increase the visibility of SDG-active employees" is – compared to other hypotheses – relatively low: 7 out of 20 trainers agree; 12 trainers disagree. On a closer look, the skepticism roots in the finding that an increased visibility of the individual would require an organization-wide implementation of such a "visibility system": *"Visibility of some activity is only possible when there is a widespread, certified, and verified system that is accepted by a group or organization. If such a system existed, they would."* So, the lack of recognizing an actual increase of visibility of the individual can be interpreted as a lack of acceptance and implementation of such systems.

Qualitative insights in interviews and workshop show a high demand for an increased visibility: *"Everyone seems to really keen and eager to make their practices and badges visible."*, is one of the conclusions of the World Café. A digital badge is found to be a simple working tool for that: *"Having a badge in a digital environment makes it easier for you to be seen by everyone you interact with (partners, colleagues)."* This is also due to the simply desire to show yourself and your interest and be seen with it: *"You promote something, others can see it."* Another trainer points out that making one visible also is a constructively creating identity: *"I like the fact that a badge can give you a place within the organization, a title, and show your coworkers what you are dedicated to."* This not only applies to individuals, but also groups: *"Groups interested in similar SDGs could be visible within the company and that would also encourage others to get involved."*

6.3.2 Increased recognition

Giving and receiving recognition is a crucial momentum for the idea of digital badges. And indeed, the increased opportunity of receiving recognition is noticed throughout the various circles of respondents: 64 % of respondents of the quantitative user survey agree that SDG-related digital badges are an attractive way to get recognized for SDG-related engagement. 8 out of 20 trainers approve the hypothesis "Badges are a form of recognition of SDG-engagement."; 10 trainers disapprove. Skepticism among trainers predominantly roots in the belief that the duty of "giving recognition" should not be brushed off to a Digital Badge System, but instead, be at the core of the organizational culture. Although, single voices do appreciate Digital Badges as a replacement of financial recognition: *"[I see] badges as some kind of recognition or non-financial reward or benefit for those who do SDG related stuff. They struggle that their SDG ambassadors do all their work without financial reward – a badge could be used as a reward."*

Approval is derived from the simple nature of appreciating recognition for one's competencies: "*I like that by obtaining a badge you get recognition for your competences.*" or simply your work: "*[I] would like the badges to be used to recognize [my] work.*" However, also the matter of fact, that now SDG-related activities and interests can be a source of recognition is appreciated: "*I like the idea that you can get recognition because you can express your interest about SDGS.*" They are seen as a highly valued form of evidence of the value of their work: "*They are concrete proof of involvement in an activity, a confirmation that you are doing good.*"

While in total 16% of Slovenian workers with email addresses say they support the SDGs with activities, only 6% of them feel that their activities are recognized and valued "very much" by colleagues and superiors. Another 23% estimate that they are appreciated "much", but only about half feel "not at all" or "a little" appreciated and valued.
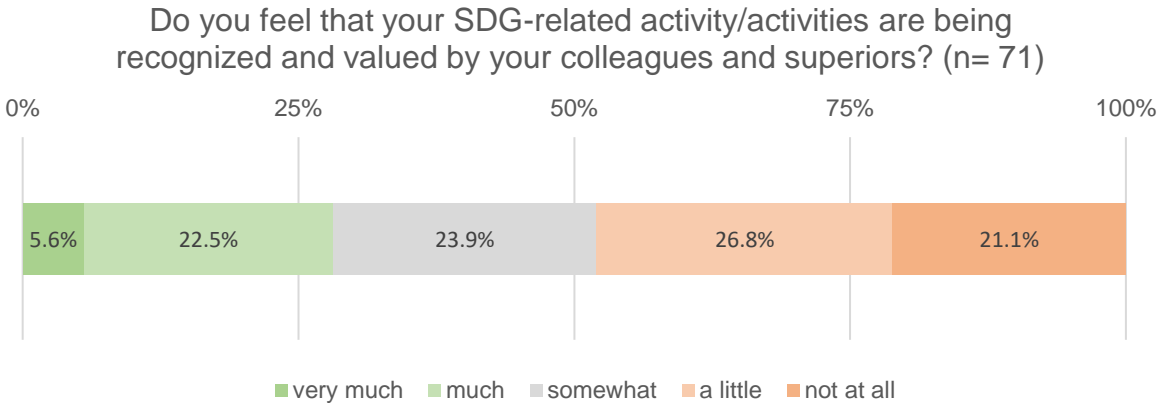
Do you feel that your SDG-related activity/activities are being
recognized and valued by your colleagues and superiors? (n= 71)

0%	25%	50%	75%	100%

5.6%	22.5%	23.9%	26.8%	21.1%

■very much ■much ■somewhat ■a little ■not at all

Figure 12: Recognition SDG-related practices.

This shows that activities related to the SDGs are under-recognized and under-valued and that there is a lack of recognition culture for the SDGs within the organization. This is where the digital badges come in. Throughout the workshops and qualitative interviews, we found that greater recognition of SDG-related activities could be one of the most important outcomes. People want to be liked; people want to be recognized. Recognition is highly desirable and relevant for both the individual and the organization. Higher recognition leads to more job satisfaction, increases productivity (Badura et al. 2017) and reduces the risk of burn-out (Weilguny-Schöfl 2020).

6.3.3 Stronger identity, sense of belonging

Because of the outcomes of finding like-minded people and exchange ideas, there is the potential to create a higher sense of belonging to an organization or to a specific group of people within the organization. Several respondents recognized the potential of "*using badges to build a group identity*." Another participant of the World Café already has extensive experience with working with "SDG ambassadors" within his/her railway organization – and likes the idea of them using digital badges to strengthen their identity as a team. Also, a trainer points out: "*I like that by obtaining a badge you feel like a part of the group of the like-minded.*"

6.4 Overall perspective

Once again, we point out that many of the findings in this paper are based on hypothetical questions. While the REPAIR project did offer a functioning badge system that allowed to claim badges, it did not provide a functioning community and organizational set-up which show to be

essential pillars of a working Digital Badge system. Nevertheless, in the quantitative user survey, we asked respondents who claimed a badge, what they did with their badge. There were nine respondents answering: A third of them downloaded the badge and put it on the social media profile. So, a third of respondents laid the base for getting seen or put out an invitation for a conversation. Also, a third of respondents felt a sense of pride about their badge – an important aspect of recognition and self-worth. Also, two out of nine respondents actively looked for others having the same badge. On the other hand, two out nine respondents did nothing after claiming their badge. This reminds us that the badge alone does not suffice, it needs further action of the claiming person.

What applies to you since you claimed this badge? Click all that
apply.
(n= 9)

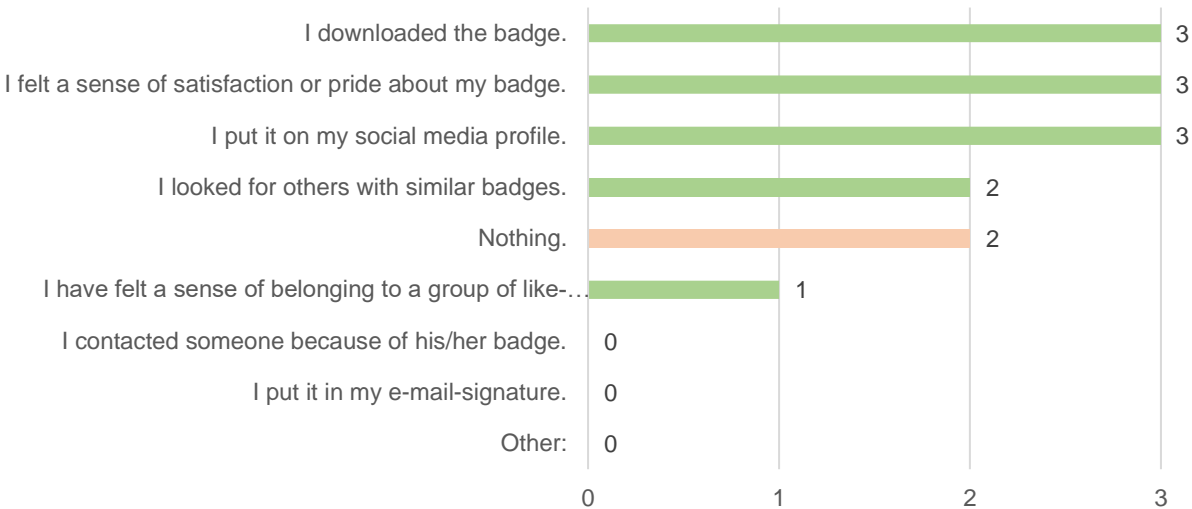|	Count
I downloaded the badge.	3
I felt a sense of satisfaction or pride about my badge.	3
I put it on my social media profile.	3
I looked for others with similar badges.	2
Nothing.	2
I have felt a sense of belonging to a group of like-…	1
I contacted someone because of his/her badge.	0
I put it in my e-mail-signature.	0
Other:	0

Figure 13: Actions taken after having claimed a SDG-related badge.

25

7 OUTCOMES // TARGET GROUP ORGANIZATIONS

OVERVIEW IMPACT MODEL

Target Groups: Organizations

higher competitiveness on (labor) market		
general performance	attractiveness as an employer	strenghtened identity, team building

Better development and deployment of staff, implementing new ideas		
improved idea and innovation developement	Exchange experiences, find like-minded	…

Increased awareness and knowledge about staff		
skills, competencies	interests, identity	practices

Improvement of position

Actions

Knowledge, Awareness

OUTCOMES

Figure 14: Impact Model // Outcomes for Organizations

Changes and outcomes on the organizational level have not been in the focus of empirical research. However, we summed up the positive consequences that emerged in interviews and workshops.

Increased awareness and knowledge about staff came up both in the workshop with HR professionals and in the World Café. One HR expert pointed out the benefits of a **higher transparency on prevalent competencies and practices**: "*Everything would change. You would know everybody who knows or practices things. It's a good way to make skills visible.*" This transparency leads to a higher **awareness of practices** on a leadership level – creating the potential of identifying and scaling up the successful ones. Transparency also allows comparison and therefore has the potential to create competition. For HR experts, the fact that "*open badges enable comparison of staff*" seemed interesting. And also the momentum of competition is seen as something positive in relation to **innovation culture**: "*[L]inked to the SDGS you could spark a little bit of healthy competition within the organization.*" In relation to the outcome of the **creation of identity and belonging** (see 6.3.3), also general benefits for the organizational culture are seen. Also, combined with a strategy that is oriented towards the SDGs, a general improvement of the **attractiveness as an employer** is talked about: "*It could improve the railway's image as an employer and at a whole: to be a really sustainable organization.*" As a result of all these positive outcomes, the potential to "*improve **general performance** of the organization*" by implementing SDG-related Digital Badges is identified. So, overall, the initial hypotheses of the project consortium that "on the organizational level open recognition […] fosters an innovation culture and the dissemination of ideas. The competencies of staff and accomplishments are documented well, talents are made visible. "can be viewed as supported. However, it is necessary to have the following critical remarks in mind.

7.1 Critical remarks and potential negative outcomes

Apart from outcomes that are considered to be intended, SDG-related badges also raised concerns among respondents.

One concerned the creation of new labels and boxes that are counter-constructive towards the creation of individual recognition: "*I am afraid [Digital Badges] would also mean putting people and us in the boxes.*" It became obvious that our project and our settings failed to successfully convey the idea of being able to create your own badges – or so to say, "your own boxes". We suspect two reasons for that: For once, the general knowledge of Digital Badges is low. So, to take the first step of imagining such a system was demanding enough. The (higher) step of creating your own badges was obviously beyond the imagination we were able to create in our settings. On the other hand, talking of the possibility of creating your own badges, a common resistance was evident: Without external validation or confirmation, Digital Badges have no value. This argument was already risen in the first prototype tests, and in trainer's interviews. Some participants also pointed out that motivation by Digital Badges cannot be seen as an adequate replacement for intrinsic motivation. Therefore, the outcome of raised motivation is questioned: "*Badges are worthless. […] everyone's work motivation has to be something internal.*"

Another point of resistance was towards Digital Badges being a kind of reward system that has the potential to be abused as a cheap replacement for recognition with actual and formal value. As a trainer indicates that he doesn't need more informal recognition, but "*more formal recognition – beyond badges*". Although, the following participant meant well in respect of Digital Badges when saying that "*badges [can be seen] as some kind of recognition or non-financial reward/benefit for those who do SDG related stuff […] They struggle that their SDG ambassadors do all their work without financial reward – a badge could be used as a reward.*" However, at the same time it points to the potential of abusing Digital Badges as cheap alternative to actual rewards.

Overall, we also have to admit, that critical expectations of positive outcomes have not been met according to empirical evidence, such as supporting personal development, orientation, affirmation; higher job satisfaction; being a pre-requirement for a better salary and helping to document the personal achievements. These outcomes were assumed in the design thinking workshop in the beginning of the project.

As it became obvious, one cannot think the implementation of an SDG-targeted Digital Badge system without the organization. The necessary changes on the organizational level as a prerequisite proves to have a higher relevancy in all empirical methods than the positive consequences. Many of the respondents did agree on optimistic hypotheses – but only if the organizational pre-requirements have been met. And if those pre-requirements like a positive culture of recognition and a firm commitment to SDGs and bottom-up innovation have been met, it would only be natural to expect a myriad of positive consequences in the organization. A Digital Badge System would only be one of many outcomes or just of many components of a major organization transformation process.

8 RESULTS IN PERSPECTIVE OF REPAIR FRAMEWORK

8.1 Results in perspective of Supporting CoPs dynamics

As stated in the REPAIR Framework, Open Badges can play a pivotal role in enhancing the dynamics of a Community of Practice (CoP) in various ways – summarized by three main aspects: Recognition and Social Capital; Learning and Skill Development; and Collaboration and Task Coordination. Their outcomes can be localized on all levels of the Impact model, although as it becomes evident from field data, their level of relevance varies.

Aspects of the category "Recognition and Social Capital" are clearly the most relevant aspect of how Open Badges can work as supporting CoPs dynamics. As shown, outcomes that link to recognition and social capital are predominant in the impact model and the perceptions of test audiences.

Learning and Skill Development is primarily considered in its manifestation as informal learning via exchange of experiences, finding like-minded people and getting more experiences oneself by carrying out an increasing number of SDG-related activities. Also, from the HR perspective, skill-tracking for tracking vocational training participation was considered relevant. Other potential outcomes like reflective learning, tracking progress and personalized learning paths have not been perceived by our respondents. However, this is not surprising considering the restrictions of the given test bed.

Concerning Collaboration and Task Coordination, perceived outcomes were scarce. The aspect to be able to identify someone due to his/her role was merely relevant in a way of identifying like-minded people or people with a certain experience for an informal exchange, and therefore closer to a function of social capital than searching for certain expertise for recruiting purposes or a team. Also, the matter of task completion was not recognized at all.

Eventually, aspects of Community Governance and Culture were clearly recognized. On the one side, as an outcome on the level of an improvement of (market) position: Organizational values that equal community values and foster a strengthened identity, the attractiveness as an employer and the general performance of the organization.

8.2 Results in perspective of SDGs Adoption Maturity Matrix (SAMM)

In the framework, the SDGs Adoption Maturity Matrix (SAMM) was introduced. The SAMM for organizations being the following:

	Awareness Raising	Experimenting	Integrating	Transforming
Definition	Understand the value of SDGs	Experimenting with practices supporting SDGs	SDGs practices are an integral part of the community of practice / organisation	SDGs have transformed the way the communities and organisations operate
Positioning question	What is the degree of SDGs awareness?	Are there SDGs initiatives? Are they encouraged and supported?	Is there a policy for systematic integration of *SDGs practices*	Is there an impact on the organisation and the community (e.g. cross-discipline collaboration, etc.)?
Action (examples leading to)	Seminars, webinars, workshops	Workshops, engaging in SDGs practices, thought experiments, challenges	Create a dashboard to measure the level of "SDG activity"	Benchmark across institutions, organisations and communities
Tools (supporting)	Leaflets, learning resources, polls	Documentation of SDGs practices, observations, suggestions, experimentations, etc.	Statistics, annual reports, policies, etc.	Benchmarking, ad hoc software
People (supporting)	Experts, SDG advocates, managers, ...	Experts, SDG advocates, ...	Managers, executives	Leaders
Indicators (success)	Number of people "SDGs aware"	Number of projects and people involved, impact	Progress indicators at organisation, community and society levels	Network effect
Badges (how it is made visible)	Participation Support *"I support SDGs"* *"SDGs Ambassador"*	Documenting projects and practices *"SDGs Mentor"* *"SDG Practice xxx"*	Documenting organisational practices *"Here we value SDGs"*	*"SDGs Champion"*
Impact (of visibility)	A growing community of SDGs aware individuals, organisations and communities	Documented, shared and recognised practices	Resilience, sustainability	Transformation

The SAMM for individual employees being this one:

	Awareness Raising	Experimenting	Integrating	Transforming
Definition	Understand the value of SDGs	Experimenting with practices supporting SDGs	SDGs practices are an integral part of practices	SDGs practices have transformed work
Positioning questions	Are SDGs relevant to my work? Do I know people who are involved in SDGs?	How do I imagine that I could contribute to SDGs? With whom?	How could I make SDGs an integral part of my work and my community/organisation?	What are the transformations necessary to be fully in line with SDGs?
Action (examples leading to)	Meeting people, conversations, attending lectures, reading, etc.	Reflecting on approaches to SDGs, inviting others in the conversation and in experimenting	Working with colleagues and/or clients in a way that is conducive to achieving SDGs	SDGs advocacy, activism, …
Tools (supporting)	Internet, books, special interest groups	Documentation of SDGs practices, observations, suggestions, experimentations, etc.	Statistics, annual reports, policies, etc.	Benchmarking, ad hoc software
People (supporting)	Experts, SDG advocates, colleagues, managers, ...	Experts, SDG advocates, colleagues, managers, ...	Colleagues, managers, executives	All!
Indicators (success)	Knowledge, social contacts, clear ideas	Formulated ideas, support from colleagues and other stakeholders	Endorsements	SDG-related social network
Badges (how it is made visible)	*"I support SDGs"*	*"SDG Practice xxx"* (author of)	Endorsements received and offered	*"SDGs Champion"*
Impact (of visibility)	A growing community of SDGs aware individuals, organisations and communities	Documented, shared, and recognised practices	Resilience, sustainability	Transformation

Combining the SAMM and the results of the field work, the questions "How can Digital Badges add to an individual's progress in the Matrix?" and "How can Digital Badges add to an organization's progress in the Matrix?".

Looking at the outcomes for the individual (see chapter 6), it is quite evident: SDG-related Digital Badges clearly support the levels of "Awareness Rising"; they feed into the level of "Experimenting"; however, the levels of "Integrating" and "Transforming" are still on the horizon. The potential of SDG-related Digital Badges to spur inspiration, raise awareness, raise motivation, connect like-minded and create Communities of Practice is quite evident to the test

audiences. Also, helping the transition from talking to first steps of walking ("Experimenting") is considered (e.g., see chapter 6.2.1). However, higher levels like "Integrating" and "Transforming" are highly dependent from the organization's policy. The implementation of SDG-related Badges alone is not enough. This point is stressed multiple times throughout the test field. On the contrary, it seems, this is where respondents see the borders of bottom-up approaches and call for top-down decisions (see chapter 5.1.1). To be able to promote a SDG-related Digital Badge system, the organization already has to be on the right track in terms of "Integrating" and "Transforming". If this is done – the potential of SDG-related badges to lift individual employees higher up on the SAMM is evident.

9 IMPLICATIONS AND RECOMMENDATIONS

Neither the SDGs nor the Open Badges are self-explanatory and self-sustaining. Both ideas and concepts need to be communicated, implemented, promoted, and supported by the organization. The good thing is, that these concepts complement each other perfectly and work synergistically.

The quantitative user survey gives good clues about what pre-conditions within the organization are seen to be required (see Figure 14). The most important aspects are the creation of an adequate positive organizational culture and the corresponding attractive benefits and incentives for using digital badges. The fact that badges should also be an accepted currency of showing your competencies outside the company is one of the most critically seen aspects. The importance of universal validity is also shown in the approval of central validation instances for badges and the non-existent importance of being able to create your own badge.

What do you think are critical preconditions for implementing a SDG related badge system in your company? (n= 14)

Create an adequate positive organizational culture.	9
Offer attractive incentives for badge claims.	9
Make sure that badges are recognized also outside the company.	6
Give information and training on the use of badges.	5
Assure central validation of a badge.	4
Implement digital badges as a standard with transparent rules.	3
Make the use obligatory.	2
Allow everyone to create own badges.	0
Other:	0
Nothing.	0

Figure 15: Preconditions for implementing an SDG-related badge system.

As shown multiple times in the previous chapters, various assumptions and requirements need to be fulfilled. Briefly summing up these findings, we identify the following measures as necessary for implementation of an SDG-related Digital Badge system to succeed:

- Install an organization-wide policy considering SDGs, recognition of individuals and bottom-up approaches. We consider committing as an organization to aiming for the SDGs, to foster the recognition of individuals and their competencies, experiences, and practices and eventually, also, committing to enabling bottom-up initiatives and engagements as essential. Otherwise, any other activities like setting up a Digital Badge System are bound to not live up to their full potential. Such a strategy also implies the necessity of adequate change/transformation processes on every level of the organization.

- Follow through the organization-wide policy considering SDGs, a culture of recognition and bottom-up approaches. A strategy is only as credible as the actions that are taken to follow it through. So, concrete measures are needed to be carried out. The implementation of a Digital Badge System being only one of a variety of measures aiming for SDGs, recognition, and bottom-up involvement. A culture of recognition should also (but not only) aim at SDG-related activities. This helps to promote ideas for SDG-related activities and strengthens the organization as an SDG-oriented company. However, it is important to say, that a culture of recognition should aim at all the values that the organization is striving for, eg. encouraging others to contribute to the solution of a problem (bottom-up approaches).
- Install trainings on the SDGs. Awareness needs to be raised about what the SDGs are and what opportunities there are for each employee to support the SDGs. Such a workshop format was developed in the Repair Project and was positively evaluated.
- Install trainings on Digital Badges. As our research showed, awareness and knowledge about Digital Badges and their potential is scarce. Therefore, with the implementation of a Digital Badge System, also training how to use them needs to be carried out.
- Install a diverse Digital Badge system. To be able to reach diverse target groups, it is recommended to have multiple badge varieties on offer (see 5.1.2), offering "quick wins" as well as badges that need more involvement.
- Install an incentive system. The attractiveness of SDG-related digital badges should be increased through incentives, with the company providing benefits for particularly outstanding activities. An incentive system motivates individual and can contribute to the crucial initial momentum of getting a new system running. Also, an incentive system reflects the actual value that certain practices have for the organization. It adds to the credibility of the organization's strategy.
- International programmes such as the Railway Sustainable Index (RSi) can support the use of digital badges, as the process can award badges to outstanding practitioners. On the other hand, it supports the badge system by increasing the visibility of SDG-related practices.

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11 ANNEXES

Please see the document "REPAIR Annex" for:

Annex I: Quantitative Worker and Trainer Survey

Annex II: Interview with Trainers

Annex III: Quantitative Users Survey