ABSTRACT
Based on the experiences of the first IPMA Hackdays in 2020 and the findings from the literature, this paper aims to place the concept of hackathons in the context of project society as a means for ideation and co-creation in the preparation phase of projects and to conceptually prepare the IPMA Hackdays 2022. Hackdays are based on hackathons popular in software development, which allow ideas to be transformed into initial concepts or prototypes. However, no attempt has yet been made to explore hackathons as a precursor to social projects. In this way, we position hackathons as a participatory effort for generating ideas for projects aiming at concepts, products, or services addressing societal challenges. Furthermore, we illustrate how projects during the hackathons can also be utilized for educational purposes, on the one hand in academic education and on the other hand as part of professional training.

KEYWORDS
Co-Creation, Hackathon, Ideation, Project society
1. INTRODUCTION

Currently, societal challenges are increasing worldwide, such as the impact of the climate crisis, refugee movements in light of the war in Ukraine and other parts of the world, and tackling the pandemic. Governments or public administrations are often unable to provide appropriate solutions on their own, and only the active engagement of civil society provides the resources and ideas needed to do so. In the context of the project society [18], however, the question arises on how to involve as many people as possible in the ideation at an early stage and motivate them to co-create. In software development, an event format called ‘hackathon’ or, synonymously, ‘hackdays’ has been established for several years and invites creative problem solving up to the concept, prototyping or even testing stage [22].

With this paper, we firstly explore the question of how hackathons can be designed and implemented to address societal challenges and secondly derive a concept for the 2nd IPMA Hackdays in June 2022 in Belgrade based on the experiences of the 1st IPMA Hackdays and the findings of existing literature. We situate the event format in the early or pre-phase of projects and show how a variety of solutions can be generated co-creatively within a competitive situation. The experience of the participants can also be used for learning or educational purposes and can be used to develop tangible solutions, products or services. During the 2nd IPMA Hackdays in Belgrade, we will observe the groups in action, capture lessons learned and subsequently publish the results.

We make three significant contributions with this paper. First, we introduce hackathons as an event format in the early phase of projects for the co-creative ideation tackling societal challenges. Second, we show how this event format can be used for the educational sector; third, we derive a suitable concept for implementing the IPMA Hackdays in 2022 based on the experiences of the 1st IPMA Hackdays and the insights gained from literature. After this introduction, we review the relevant literature and available research findings. On this basis, we describe the concept of the IPMA Hackdays 2022, which we then discuss and round off with a conclusion.

2. BACKGROUND INFORMATION

The following is a summary of key findings from the literature on the three key topics of this article, hackathons, ideation and co-creation, and the project society.

2.1 Hackathons

The use of hackathons for problem-solving originated in software development, where contests were held in which groups of programmers competed against each other to develop prototypes or initial applications for an evaluation and further exploitation [13]. There has been relatively little research on hackathons so far, so it is still relatively difficult to draw a conceptual boundary. One way to define hackathons is: “A hackathon is one type of organized, goal-driven innovation contest, a short time-bound event with a challenge to be solved creatively in co-operation and collocation of teams, whose results are presented and recognized in a ceremony at the end of the event” [12]. This definition shows the essential attributes, even though there are quite different characteristics and notions for this type of event. The term is created from the two words ‘hacking’ and ‘marathon’, the former addressing the actual problem resolution and the latter describing the duration of time, which can be up to a week. Since hackathons are often held over a few days, they are sometimes called ‘hackdays’. They could be held within an organization to generate or identify innovative ideas, or publicly for a good cause as an ‘Urban Living Lab (ULL)’ [2], either as a virtual or as a face-to-face event.
Hackathons are popular because, on the one hand, they are based on a co-creative approach in which everyone can learn from each other and, on the other hand, concrete product or solution approaches result for the one hosting the hackathon and who pushes the ideas forward towards a new solution. This can be in the sense of new projects, ideas for business development or even for social purposes. Hackathons can be used to develop initial ideas for a project proposal, benchmark those ideas in competition with others, test the response of sponsors or judges, or get a group of people excited about a project and encouraged to work together. However, hackathons can also be used purely for learning purposes [22], allowing students to live through the process collaboratively, experiencing methods such as design thinking, scrum, or creativity techniques in practical use. The hackathon can be embedded between lectures on business development, innovation and project management or creativity techniques and the development of tangible (business) solutions [8]. Students can escape the mode of listening in hackathons and collaboratively develop the mindset needed for innovation in a concrete situation, preparing them to solve complex problems after completing their studies [14]. Research shows that hackathons are attractive forms of learning and students learn to be solution-oriented, employ a selection of helpful technologies and practices, and form an ‘outside-the-box’ mindset [15].

However, the literature is also critical of the fact that only a single-digit percentage of projects still have activity six months after the conclusion of the hackathon [26]. It is therefore important for the organizer not only to provide an opportunity for learning in the form of the hackathon, but also to ensure a sustainable development of the promising ideas after the end of the event. This should be taken into account even before the hackathon begins. Research findings suggest that “short- and long-term continuation are different phenomenon. While short-term continuation is associated with technical preparation, number of technologies used in a project and winning a hackathon, long-term continuation is predicted on skill diversity among team members, their technical capabilities in relationship to the technologies and their intention to expand the reach of a project” [27: 145]

### 2.2 Ideation and Co-Creation

The term ‘ideation’ typically refers to the generation of a variety of ideas and potential solutions through the application of methods and techniques, which can then be evaluated and further processed in subsequent stages. For ideation, the approach of divergent thinking in a collaborative environment is typically used [23]. The most effective generation of potential solutions in the ideation process not only depends on a clear formulation of the goal or expectation by the client, but also, as current research shows, on the framing of the issue or the most solution-neutral and broad description of the challenge [28]. This should not only be left to the sponsor, but, if possible, should be formulated at the beginning of the ideation process by the participants or those affected themselves. On the one hand, they then introduce the real challenges encountered in practice and, on the other hand, it motivates them to participate in the problem-solving process. Consequently, it becomes clear that ideation is a collaborative endeavor in which a finite number of people with a shared sense of the issue and preferably diverse capabilities set out to formulate and work on the problem [10]. Kier and McMullen [21] highlight three cognitive skills for creative problem-solving: creative, social, and practical imaginativeness. Therefore, before the ideation begins by forming a team, it is necessary to make the skills of the individual participants explicit and to ensure that the composition of the team is as heterogeneous as possible.

Not only are hackathons increasingly used within companies or in the context of ‘open innovation’ initiatives as a means for co-creative generation of ideas [9], but also in the public sector, such as in the design of urban public space [7] or in coping with the COVID-19 pandemic [29]. In this context, especially the great enthusiasm among participants as well as the large number of proposed
solutions can serve as an encouragement to organize this form of ideation event. Moreover, a frequently desired by-product is the learning of basic skills for business model, process or product innovation respectively entrepreneurship [20].

2.3 Project Society

“Everyone has a project. People have projects on behalf of themselves and on behalf of others; they have their own projects, and they have collective projects” [18: 9]. Projects permeate society today. They are used as a form of learning in kindergarten, school and university, and are just as indispensable in professional life for the efficient achievement of demanding goals as they are in public service and civic society. Often, the concepts of project management that have been successfully implemented in business serve as a blueprint for the realization of projects in other areas of life as well. Strategies, structures and processes adopted from the economy are thereby also adopted in other areas of society [25], without being sufficiently reflected upon and adapted to the specific requirements of societal challenges such as climate change, the pandemic or the refugee crisis.

Boltanski and Chiapello [5] therefore bring projects from a sociological perspective into the context of social activities, where people network, work co-creatively on the realization of projects, disengage again, and do new things in renewed constellations. This form of project society focuses on projects to solve societal tasks. It is less about managing these projects than about organizing and problem-solving jointly. This requires certain skills, roles, design strategies and suitable framework conditions.

Thus, the design framework of a project provides the necessary structure for the participants to engage collectively from the time of clarifying the task and objectives, through ideation, to the realization and utilization of the project results. Specific actors, such as a project manager, facilitators, or engagement managers, specific approaches, methods, and tools along the lifecycle of the project help to improve the effectiveness and efficiency of the undertaking [3] without limiting the ability to innovate. Projects offer the opportunity for collective learning [11]. On the one hand, this is due to the fact that the participants bring in learning experiences from previous projects or the team comes together again in a similar constellation and thus achieves a high level of performance more quickly. On the other hand, a completely different approach and innovative ideas can emerge, especially through a new team composition, while synergies do not have to be lost.

Yannick Kalff [19] points out rightly that projects can certainly establish a contradictory logic for the individual, on the one hand the opportunity for self-realization and, on the other hand, the disciplining by the set framework conditions. Particularly at the beginning of a project, when it is a matter of selecting the problem and the goals, during the co-creative search for possible solutions, and in the selection of suitable paths, the framework should be interpreted more broadly and leave space that allows for creative freedom. As society becomes increasingly projectified [16], it is therefore important for everyone to be aware of the networks in which they operate and to assess them in terms of the extent to which they are helpful for the project tasks at hand, what experience they can draw on, or how the network can be further expanded by taking on new projects [11]. Hackathons are a promising format in this context for leveraging citizen capabilities through joint project activities while solving societal challenges [17].

3. CONCEPTUAL DESIGN

The purpose of the following conceptual design is threefold. First, it serves to prepare the IPMA Hackdays 2022, which are planned as a face-to-face event in Belgrade in June 2022. Second, the
conceptual design also serves to describe hackathons as an event format at universities to learn new methods for ideation and co-creation as well as to build competences for students for transferring what they have learned into their professional work. Last but not least, it is intended to test approaches for the early phase of projects with extensive involvement of the participants in order to explore participatory forms of project development in the context of a project society.

3.1 Experiences of the IPMA Hackdays 2020

Originally planned as part of the IPMA Research Conference 2020 in Berlin, the first edition of the IPMA Hackdays had to be planned and held as an online event, just like the research conference itself, due to the outbreak of the COVID-19 pandemic. Registered participants of the research conference were able to enroll in the hackdays, which took place a few days beforehand, and were informed about the purpose, process, and rules of the hackdays through a webinar. Slack was provided as a working platform. There, the participants were able to organize themselves into groups, choosing from seven key topics, with the main focus on self-organization, agile working and the necessary prerequisites for this. Out of about 20 participants who signed up for the hackdays, three groups formed to organize themselves and work on their topic and to prepare for a presentation to a jury, which chose a winner based on pre-defined criteria. "One team presented their findings on 'Developments, Potential and Application areas of self-organizing', another team developed an 8-minute video on 'Mindset, Culture and Atmosphere for Self-Organization' and the third group finally presented a 'Self-Organization Navigator'. This solution convinced the judges the most. However, for all teams, the focus was more on experiencing self-organization on a topic in a very short time" [30].

The IPMA Hackdays 2020 were organized based on the following five phases:
- **Phase 1** ("Think the work"), including choosing a topic and defining a meaningful and relevant question that should be answered during the Hackdays.
- **Phase 2** ("Plan the work"), including selecting a project leader, agreeing to checkpoints and distributing work.
- **Phase 3** ("Work the plan"), including converging and finalizing the deliverable as well as the presentation for phase 4.
- **Phase 4** ("Share the work"), including presenting the work and answering judges' questions.
- **Phase 5** ("Winner announcement and showcase"), including being recognized on a (virtual) stage and sharing experiences.

After the event, one of the teams continued to work on their concept. They published it through IPMA as an 'IPMA Insight' report, and also published in two blogposts their own experiences gained throughout the exercise.

3.2 The context of the IPMA Hackdays 2022

Drawing on the good experience of IPMA Hackdays 2020 and the theme of the 2022 Research Conference, which is "Value co-creation in the project society", the hackdays were again to be held in 2022 in the context of the IPMA Research Conference, but this time in presence and with the target group of students and young professionals from the Western Balkan countries together with representatives of the IPMA Young Crew. From June 18 through 20, students from different study programs and universities will meet at the venue in Belgrade (Serbia) and organize themselves to work in up to six different groups on a topic of their own choosing from the following list:

- Climate action
- Circular economy
This time the hackdays will be supervised, monitored and evaluated by a research project that has been funded by the German Federal Government. The aim is, on the one hand, to boost the transfer of university education to practice through suitable educational formats and, on the other hand, to generally foster innovative capacity and business development in the countries of the Western Balkans.

### 3.3 Attributes and archetypes of hackathons

According to Halvari et al. [12], hackathons can be described by nine attributes that can have different manifestations from case to case: 1. organizer, 2. duration, 3. collocation, 4. challenge, 5. ceremony, 6. teams, 7. goal, 8. collaboration, and 9. creation process. Building on their observations, hackathons are organization-hosted, temporary competitions held in a shared space or virtually with the goal of co-creation. Topics are usually specified, and a prize is offered for the best results based on pre-determined criteria. These prizes are then awarded during a ceremony. Several teams compete against each other to enter the process of ideation and creation within a team - or across teams - and present a concept, prototype or minimum viable product (MVP) at the end.

In Halvari et al. [13] four archetypes of hackathon-use are mentioned, based on the focal interest and the body of participants. If the participant base is designed to be open, then hackathons can be used to achieve a variety of tangible results in the sense of ‘crowd-sourcing’ or, more generally, to support collaboration, networking and ‘community building’. If, however, a hackathon is more closed in terms of participation, then it can be either about training and learning in the sense of ‘learning-by-doing’ or just about the targeted creation of concepts, prototypes or products. It may also be that a hackathon is about more than one of these objectives and thus a combination.

### 3.4 Outcomes and design aspects for hackathons

As briefly outlined above, there are either tangible or intangible outcomes. According to Angarita and Nolte [1], the former can be technical or non-technical artifacts, e.g. prototypes, products or solution concepts and publications. Intangible outcomes are, for example, learning, networking, interdisciplinary collaboration, idea generation, entrepreneurial action, or simply the creation of awareness for the topic of the hackathon. Based on an extensive literature review, the authors show that there is a relationship between the design of a hackathon and the achievement and sustainment of outcomes. In the design of a hackathon, the duration, the theme and objectives, the team formation and the process, the competitive situation and the support offered are all factors that play a role. The participants, i.e. the organizer, the judges, the teams and individuals taking part in the hackathon as well as other people in the environment are equally determinants for achieving the objectives. For example, it was found that a period of 48 hours with breaks and recovery periods is sufficient to achieve first results. Similarly, team size plays a role in successful collaboration, in a virtual as well as a face-to-face event. A briefing in advance on the processes and technologies of the hackathon makes it easier for teams to get started. Finally, the continuation of the teamwork beyond the hackathon enables the sustainment of the outcomes.
3.5 Prerequisites, benefits and pitfalls of hackathons

In order to achieve a successful collaboration during the hackathon, a number of prerequisites have to be satisfied. These include the description of a topic that is attractive to the target audience and for which solutions are sought through the hackathon. A sufficient number of participants with different backgrounds of experience and skills, effective moderation of the entire event, as well as the skills in the teams to structure the work process, to provide sufficient input during the ideation phase and to prepare the results in an appealing way for the evaluation. The ambience, the recognition at the end of the hackathon, and the perspective for further work on the results should also be appealing [4].

The benefits of conducting hackathons could be seen as promoting learning, building creative and collaborative capabilities in a team as well as solving real-world challenges [6]. The competitive environment of the hackathon may stimulate “outside-the-box” thinking and help to develop creative concepts, prototypes or new business ideas. Hackathons support forming cooperative networks and foster mutually beneficial relationships [7]. Pitfalls may include not having enough time to thoroughly address the problem and potential solutions. Teams may be tempted to focus solely on winning the hackathon and not so much on the longevity of the solution and continuation of the collaboration beyond the end of the hackathon.

3.6 Concept for the IPMA Hackdays 2022

Building on the attributes of Halvari et al [12], the IPMA Hackdays 2022 under the theme “Hacking societal challenges in a co-creative way” will be configured as follows:

a. Organization: In addition to IPMA and IPMA Serbia, as organizers of the IPMA Research Conference 2022, a team of the research project KomBEU will co-organize and moderate the hackdays. The first two are responsible for the conference venue and the program of the entire research conference, the promotion of the event as well as the implementation, in particular also the prize-giving ceremony during the IPMA Research Award Gala. The KomBEU team prepares the hackdays both in terms of content and organization, moderates the event and in addition observes the groups at work. Afterwards, the team will conduct a scientific evaluation of the discoveries.

b. Duration: The hackdays are scheduled to begin on June 18 at 9 a.m. and will end on the morning of June 20 with the presentation of results. The award ceremony will then take place on the evening of June 20, as part of the IPMA Research Award Gala 2022.

c. Collocation: Unlike IPMA Hackdays 2020, this year’s hackdays will not take place virtually, but on the premises of the National Academy for Public Administration (NAPA) in Belgrade. All participants will meet there and then get into their group workspaces in the same building. Importantly, each group will have its own workspace where they can set up and work on their tasks in a focused manner.

d. Challenge: The theme of the overarching IPMA Research Conference 2022 is “Value co-creation in the project society” and is dedicated, among other things, to the societal challenges of climate change, digitalization and the solutions that can be provided for this by means of projects and project management. Eight main topics were selected for the IPMA Hackdays (see 3.2), from which the groups can each choose a challenge to work on. The ambition of the IPMA Hackdays 2022 is not only a shared experience in the context of co-creative collaboration but also a specific sketch of a solution, a prototype or concept that is mature enough to be implemented.
e. **Ceremony:** At the end of the competition, a group of distinguished judges will evaluate all the solutions presented based on their experience and predefined criteria and select a winning group. The winners will be awarded during the IPMA Research Award Gala on Monday, June 20th, 2022. All group members of the winning team will receive both training and coaching on how to turn their idea into reality, as well as a cash prize totaling 500 Euros. The 2nd and 3rd placed groups will also receive training and books. The IPMA will report on the IPMA Hackdays and the winning team in its newsletter, a blog post, and connected social media to create publicity.

f. **Teams:** Students and young professionals from Serbia and the Western Balkans as well as members of the IPMA Young Crew were invited to participate in IPMA Hackdays 2022. A total of up to 6 groups can participate in the hackdays, although the size of the groups may vary. The groups can come from one university or field of study or be formed at the beginning of the hackdays in order to find a composition that is as diverse as possible.

g. **Goal:** The IPMA Hackdays 2022 were organized with a number of objectives in mind. One of these objectives was to explore hackdays as an approach or method in the pre-project or early phase of a project to generate ideas, sketches of solutions or initial concepts, which can then be transferred into reality. Another objective was to enable networked learning based on tangible tasks that can deliver a societal or professional contribution. Finally, there is also a scientific interest in conducting hackdays for co-creative ideation and collaboration. The latter is the perspective of the KomBEU research project, which is intended to promote the transfer of creative ideas from education or university activities into practice in the sense of business development. The IPMA Hackdays 2022 could serve as an experiment.

h. **Collaboration:** The organizers do not specify how the teams should organize their collaboration, which methods and information are to be used, or which tools they are to use during the hackdays. However, this will be one of the observation points, which methods and tools are used for this purpose, whether these were adequately taught during the lessons, or which were particularly helpful during the hackdays. There is generally a competition between the different teams, as in the end there is only one winning team. Nevertheless, the teams can also support each other.

i. **Creation process:** IPMA Hackdays 2022 will also follow the phases outlined in 3.1. from the selection of the topic or challenge by the team to the pitch in front of the judges. The teams will be informed in advance of the criteria that will be used for evaluation by the judges. The following three criteria are applied during the judging process: 1. Innovation/Originality (How creative is the solution? Does it do something new and unique?), 2. Impact/Business Value (What is the extent of the impact of the proposed solution? How valuable is it to business? And to society?), and 3. Viability/Future plans (Is the solution implementable and marketable? Does it have economic value, and is it sustainable as a commercial proposition, with plans for the future?).

Based on the design of the concept and the archetypes mentioned by Halvarei et al. [13], it can be concluded that the IPMA Hackdays 2022 can be referred to as a ‘crowd-sourcing’ archetype due to the open invitation and the interest in obtaining tangible results, concepts as well as experiences in the design of ideation and co-creative collaboration.

### 4. DISCUSSION

The concept for idea generation or problem solving, which originally originated in software development, has established itself in other application areas according to the literature presented here [12, 13]. On the one hand, as a tool for collaborative learning, in teaching or in the design of
Participation in IPMA Hackdays 2022 is intended to enable students and young professionals from Serbia and the Western Balkan countries to apply the knowledge gained during their studies in real projects and to prepare for a transfer into practice. At the same time, they will experience new forms of learning and teaching, which can be integrated into future education and at the same time enable them to deal with social issues through projects. The use of hackathons is still relatively new, so there has been limited research on the process in a systematic way. For example, besides general observations, there is little consideration of the effectiveness of hackathons based on the processes, methods, and tools used [1, 26]. There is also currently a lack of experience with hackathons in Serbia and the Western Balkans, which is why the implementation of the IPMA Hackdays 2022 is in some ways entering new territory, especially in terms of its use in the context of higher education and applying it to societal challenges. Therefore, the scientific coverage of the event organized by IPMA in Serbia is helpful to evaluate the experience in practice and to gather knowledge for further use. If necessary, comparative studies in other countries can identify specific success factors.

5. CONCLUSIONS

The intention of this paper was to explore the question of how hackathons can be designed and implemented for addressing societal challenges and to prepare for the IPMA Hackdays in June 2022 in Belgrade. Based on the findings from the first IPMA Hackdays and the literature, hackathons promise to be an attractive event format, especially for younger people. They were situated as an event format in the early or pre-project phase to start into ideation and co-creatively collaborate in a competitive environment of several student teams. The aim of the hackdays is to provide the participants an experience of learning and developing tangible solutions, products or services for societal challenges. The present concept will be implemented in June 2022 and subsequently evaluated by means of scientific monitoring.

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