D7.13 How to Implement a Start-Up Competition - Toolkit of Guidelines and Recommendations

27/03/2024

Anubhav Ambooken[1], Niklas Effenberger[1],
Johannes Sautter[1], Marielisa Padilla[1], Pelumi Akinmade[1]

[1] Fraunhofer IAO, Nobelstraße 12, 70569 Stuttgart

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 864242
Topic: LC-SC3-SCC-1-2018-2019-2020: Smart Cities and Communities

Dissemination level

PU	Public	X
CO	Confidential, only for members of the consortium (including the Commission Services)	

Deliverable administration

No & name	**D7.13 How to Implement a Start-Up Competition - Toolkit of Guidelines and Recommendations**				
Status	Released	**Due**	M54	**Date**	2024-03-27
Author(s)	FHG				
Description of the related task and the deliverable. Extract from DoA	**T7.4 SPARCs Start-Up Competition (FHG) M22 – M54** The validation of the SPARCs smart interventions in the lighthouse (and following) cities will ensure the realisation of the ambitious project impacts and the maximisation of its replication potential in diverse contexts around the EU. However, the real value of the SPARCs project will be revealed and untapped only if it achieves to directly involve local smart city business ecosystems in co-designing and co-creating their sustainable future through novel additional services. SPARCs will work towards opening up both the accumulated knowledge of the project, but also its infrastructure to new interested parties that would like to be engaged not only after but also during the project's implementation and demonstration phases, adopting an open innovation agile development approach, where external entities (mainly innovative start-ups and SMEs) could provide added value services and features that will help to strengthen the project's impact, while reinforcing the lighthouse and Fellow Cities' smart city vision and accelerating their smart transition. In this context, SPARCs will contribute to start-up smart city competition initiatives in the LHCs and FCs. Inspired by the Pre-Commercial Procurement process of the European Commission, this task will connect with ongoing activities taking place in LHCs, by assisting, documenting, and assessing lessons learnt in existing processes. The addressed existing initiatives are the Smart City Challenge, by the city of Leipzig, and the Sustainable Mobility Challenge, by KONE in the Espoo lighthouse. The documentation, and assessment of lessons learnt has the intention to inform and guide future similar replication activities in the FCs. **D7.13 How to Implement a Start-Up Competition – Toolkit of Guidelines and Recommendations (FHG)** The D7.13 is the direct continuation of D7.4. This deliverable consists of a transfer of capacities from the start-up smart city challenge deployed in LHCs to FCs, concerned Start-Ups/ SMEs, and larger industrial–commercial contexts. The aim of this deliverable is to organise and implement workshops and consultations among LHCs and FCs to facilitate the understanding of replications and outcomes, to adapt guidelines and tools to local contexts and needs, and ultimately to assist the replication of start-up smart city competition replications in FCs and possibly beyond SPARCs. Not only internal moderators but also invited speakers will assist with the technical, communication, and financial aspects of these activities.				
Participants	FHG, LPZ, KONE				

Comments			
V	Date	Authors	Description
0.1	05/04/2023	FHG	First internal FHG draft
0.2	05/07/2023	FHG	Second internal FHG draft
0.3	29/01/2024	FHG, NEW	Draft released for internal review
0.4	31/01/2024	FHG	Incorporate the comments received from the reviewers
0.5	12/03/2024	FHG, VTT	Deliverable checked by WP leader and released to the Coordinator and the Quality Manager for quality check and subsequent submission to the EC.
1.0	27/03/2024	VTT	Coordinator submits the deliverable to the EC

About SPARCS

Sustainable energy Positive & zero cARbon CommunitieS demonstrates and validates technically and socioeconomically viable and replicable, innovative solutions for rolling out smart, integrated positive energy systems for the transition to a citizen centred zero carbon & resource efficient economy. SPARCS facilitates the participation of buildings to the energy market enabling new services and a virtual power plant concept, creating VirtualPositiveEnergy communities as energy democratic playground (positive energy districts can exchange energy with energy entities located outside the district). Seven cities will demonstrate 100+ actions turning buildings, blocks, and districts into energy prosumers. Impacts span economic growth, improved quality of life, and environmental benefits towards the EC policy framework for climate and energy, the SET plan and UN Sustainable Development goals. SPARCS co-creation brings together citizens, companies, research organizations, city planning and decision making entities, transforming cities to carbon-free inclusive communities. Lighthouse cities Espoo (FI) and Leipzig (DE) implement large demonstrations. Fellow cities Reykjavik (IS), Maia (PT), Lviv (UA), Kifissia (EL) and Kladno (CZ) prepare replication with hands-on feasibility studies. SPARCS identifies bankable actions to accelerate market uptake, pioneers innovative, exploitable governance and business models boosting the transformation processes, joint procurement procedures and citizen engaging mechanisms in an overarching city planning instrument toward the bold City Vision 2050. SPARCS engages 30 partners from 8 EU Member States (FI, DE, PT, CY, EL, BE, CZ, IT) and 2 non-EU countries (UA, IS), representing key stakeholders within the value chain of urban challenges and smart, sustainable cities bringing together three distinct but also overlapping knowledge areas: (i) City Energy Systems, (ii) ICT and Interoperability, (iii) Business Innovation and Market Knowledge.

Partners

Table of Contents

EXECUTIVE SUMMARY

This document provides a comprehensive set of guidelines for organisations and cities looking to organise a successful start-up competition in the field of Smart City interventions. It serves as a toolkit for future start-up competition organisers within and beyond SPARCS. It is based on the lessons learnt from the smart city challenges deployed in the project's Light House Cities Espoo and Leipzig. The paper provides a list of nine important considerations for prospective start-up competition stakeholders. The key considerations identified are:

1. competition objectives, vision, and expected results
2. detailed plan
3. competition design
4. finance
5. legal and contractual obligations
6. event management and logistics
7. communication and public relations
8. partners and stakeholders
9. jury board and team of mentors

Furthermore, the paper details a step-by-step approach to planning and executing a successful start-up competition, highlighting key considerations for each stage. It emphasises the importance of clearly defining the competition goals and criteria, identifying and engaging relevant stakeholders, developing effective communication strategies, and leveraging appropriate technology platforms. It also provides recommendations directly from the organisers of the Espoo and Leipzig smart city start – up competitions.

Overall, the paper serves as a valuable resource for organisations planning to organise a start-up competition and provides a toolkit of guidelines and recommendations to help ensure succes.

1. INTRODUCTION

1.1 Purpose and Target Group

This deliverable provides a hands-on toolkit to successfully replicate a Smart City start-up competition based on the lessons learnt from the SPARCS project. It is intended to assist in the transfer of the capacity developed and knowledge gained during the start-up smart city competitions deployed in the two SPARCS Lighthouse Cities (LHCs). The Sustainable Mobility Challenge in Espoo, Finland, was conducted by the SPARCS project partner KONE, which is a global leader of people flow solutions with a mission to improve the flow of urban life. In the SPARCS project, KONE focusses on co-creating sustainable and energy-positive cities by engaging citizens and varying stakeholders in designing new solutions and co-creating new business models.

The Smart City Challenge 2021 in Leipzig was conducted by the Digital City Unit of Leipzig, which acts as an interface between the city administration of Leipzig and society, companies, and science, as well as the municipal utilities. It deals with the fundamental issues of digital transformation and develops and manages innovative projects with various players in the urban system, for example in the areas of energy and digital infrastructure.

This toolkit will be used to organise and implement workshops and consultations between LHCs and Fellow Cities (FC) while adapting the guidelines and tools, local contexts, and needs of the FCs. The deliverable targets FCs in the SPARCS project concerning start-ups, small and medium enterprises (SMEs), and larger industrial contexts.

1.2 Contributions of Partners

FHG IAO is responsible for the compilation of the main content of this deliverable and outlined the deliverable's scope and goals, composed the contents using the "D7.4 Lighthouse Cities Start-Up Smart City Challenge Report and Lessons Learnt" document (See reference chapter). The Figure 1 shows how both the deliverables are interconnected. The "D7.5 Supporting Toolkit for Startup Competitions" adds onto the conceptual underpinnings of the start-up competitions. Information from the internal communication materials was used while organising both start-up competitions in Leipzig and Espoo, and independent research.

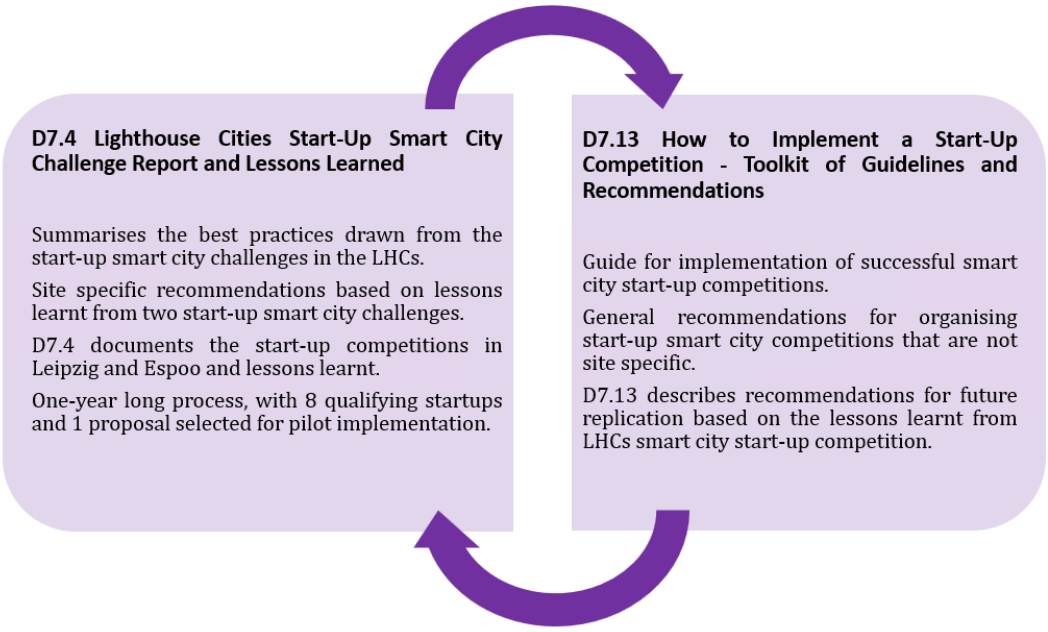

Figure 1-1: Overview of D7.4 and D7.13

1.3 Background and Objectives

This document is a deliverable from Work Package 7 Exploitation and Business Ecosystems, and more specifically Task 7.4. The task focuses on maximising the replication potential of the SPARCS project and its related partner programmes. It attempts to involve local smart city business ecosystems and to open up the accumulated knowledge of the project, mainly towards innovative start-ups and SMEs. This deliverable aims to organise and implement workshops and consultation among LHCs and FCs to facilitate the understanding of replications and outcomes, to adapt guidelines and tools required for local contexts and needs, and ultimately to assist the replication of smart city start-up competition replications in FCs and possibly beyond SPARCS.

1.4 Structure

This document is divided into three main chapters. The first chapter explains the key considerations for organisers and stakeholders in a smart city start-up competition. The second chapter provides a practical guide or manual of step-by-step actions and decisions at every stage, from pre-planning to post-competition. The third chapter offers a summary of helpful advice, recommendations, and obstacles to avoid based on the experience from the Leipzig and Espoo start-up competition to ensure successful replication and even better results in FCs.

2. KEY CONSIDERATIONS OF SMART CITY START-UP COMPETITIONS

This chapter presents a concise list of the essential considerations for successfully replicating the smart city start-up competitions. It informs on the basic concepts related to organising smart city start-up competitions, specifically

1. competition objectives, vision and expected results
2. detailed plan
3. competition design
4. finance
5. legal and contractual obligations
6. event management and logistics
7. communication and publicity
8. partners and stakeholders
9. the jury board and team of mentors.

Each of these topics must be thoroughly discussed once the decision has been made to execute a start-up challenge.

2.1 Competition Objectives, Vision, and Expected Results

The competition's objective is the single most important consideration in the planning and execution of a smart city start-up challenge, as it determines majority of the direction and strongly influences decisions throughout the life cycle of the event. Competition objectives must be clearly defined and written out early, with the consensus of the organising stakeholders. (see section partners and stakeholders). It is essential to set a single and well-defined objective for the competition on which different strategy and problem statements will be based. The written objectives of the competition explain the expected results and set the benchmark for evaluating a successful competition. The objectives, vision and desired outcomes of this competition should be communicated to all new stakeholders during onboarding into the planning process. A well-defined goal and problem statement provide organisational, planning, and implementation direction to the competition.

2.2 Detailed Plan

A detailed project management plan identifies all of the steps and processes for the execution of the event. This plan should indicate timelines, deadlines, due dates and responsible stakeholders for all tasks. Since the plan may evolve as planning progresses, it must be flexible enough to allow for reasonable changes. To enhance the plan's resilience, proactive measures in the form of mitigation strategies should be developed and integrated. These strategies serve as contingency plans to minimize the impact of identified risks. By incorporating risk identification and mitigation into the project management plan, organizers can ensure not only a detailed and well-organized execution strategy but also a flexible framework that can adapt to unforeseen challenges as they arise during the planning and execution phases of the event. The plan may cover the following aspects: Competition format, infrastructural and operational needs, stakeholder requirements, work schedule, finance, and terms and conditions.

2.3 Competition Design

The design describes the workplan adopted by the organisers to execute the start-up competition. The design should be compared frequently with the competition objectives to ensure synergy. There are several known competition designs for start-up competitions, and stakeholders can make informed choices based on the defined goals. The overall objective must be to design a competition that attracts the specific smart city solutions that answer the problem statement. The competition design should clearly outline the selection criteria for successful proposals to remove ambiguity and improve transparency. A clear competition design helps the jury team to make an objective evaluation on the level of fit between the proposals and the available standard. It directs the entire focus to the competition objective, ensuring that successful proposals are selected based on a standardised set of metrics already communicated to all participants.

2.4 Finances

Financial considerations are one of the most common limitations when implementing a smart city start-up competition. Topics such as funding sources, sponsors, prize money, logistic costs, personnel costs, etc. are major considerations during planning. They may influence the size and design of the competition. Other factors to consider in this topic are procurement regulations within the hosting organisation and the existing budget.

2.5 Legal and Contractual Obligations

A contractual obligation is created when a contract is made and determines the actions that each party has agreed to take or is mandated not to take. The legal implications of every agreement and partnership should be clearly understood and carefully considered. A smart city start-up competition requires several implied and explicit contracts between stakeholders and participants; these terms and conditions should be adequately informed to all signatories. Competent legal advice should be sought to clarify any grey areas. Organisers should also pay attention to their internal legal and administrative frameworks that may cause delays in execution.

2.6 Event Management and Logistics

An event manager should be designated, who will coordinate on behalf of the organisers with vendors providing event venue selection, event venue design and decoration, seating arrangements, food and beverages, lighting, and general logistics. There is a recent possibility of hosting the event virtually; however, the limitations of this approach should be carefully considered.

2.7 Communication and Publicity

Effective publicity and communication are important to attract the right quality and quantity of participants during the events, and furthermore helps successful solutions and start-ups gain the necessary public attention. An effective communication strategy that precisely engages the target audience is important, and decisions on communication materials and methods must be factored into the planning process early enough. It is recommended to outsource the design of the communication strategy to competent professionals for the best results if it is financially feasible. The prize of the competition plays an integral role in the success of startup competitions by motivating participants,

increasing visibility, enhancing credibility, facilitating networking, and building the competition's brand.

2.8 Partners & Stakeholders

A smart city competition usually requires the input of several individuals, companies, organisations and bodies as partners and stakeholders. A successful competition requires all of these partners to meet a minimum standard that must be established clearly from the beginning of the project. They are sometimes required to work together, or simultaneously with dependent tasks; therefore, it is the responsibility of the organising entity to verify the capacity of all stakeholders before contracts are signed. All responsibilities and expectations should be made known from the start, management and coordination are still required after contracts to ensure smooth running. Regular update meetings and communication channels should be set up to identify problems and monitor progress. Refer to section 2.2 in D7.5 for identifying the roles of the partners.

2.9 The Jury Board and Team of Mentors

Selecting the right panel and mentors increases the confidence and interest in the competition. Therefore, prospective jury members should be considered experts in the fields that are important to the theme and goals of the competition. Careful consideration should be given to the selection of mentors and jury members to ensure fairness and transparency, as conflicts may arise when mentors also serve as jury members, potentially leading to biased evaluations and perceptions of injustice among participants. Refer to section 2.3 in D7.5 for jury selection. Additionally, jurors should not hold shares in the companies competing to avoid conflicts of interest. Each member should be identified based on his/her expertise and contribution to the competition. The mentoring team should also consist of diverse expertise, in predetermined areas of expertise and knowledge transfer. The areas of expertise of the jurors and mentors from the SPARCS start-up competitions are shown below as examples.

1. Information Technology (IT)/Internet of Things (IOT), digitalisation, technology, data analysis and visualisation, augmented reality (AR) and virtual reality (VR)
2. Strategic development, start-ups
3. Business and finance, management, and business ecosystems, sales, management, business strategies, business development, marketing, economics
4. Service design, human-centred design, Design research, participatory design/co-design, user experience design.
5. Sustainable operations, Sustainable development, Environmental protection, sustainability, air quality
6. Citizen engagement and participation
7. Urban mobility
8. Energy
9. Tourism, Local experience, and regional development

3. Practical Guide to a Successful Implementation of Smart City Start-up Competitions

This chapter offers a step-by-step guide for organising a successful Smart City start-up competition. This list is not exhaustive but is expected to cover the most important aspects of the implementation. Organisers must adapt these guidelines to their specific scenarios as much as possible for improved results. The steps are categorised into four stages:

1. pre-planning
2. planning
3. implementation
4. post-competition.

A list of important tasks to be performed at each stage is outlined and preceded by a brief description of each stage.

3.1 Pre-Planning

Pre-Planning

Step 1 Justification of the start-up competition

- Identify the goals to be met and evaluate whether a start-up competition is the best way to achieve the identified goals. It is necessary to ensure that the competition is suitable for the purpose. Evaluate other methods to achieve the set goals and ensure that a start-up competition offers the best solution.

Step 2 Review of resources

- Conduct a review of all the available resources, time, human resources and connections. Then make a general assessment to see if a successful competition is realistic within the needed time frame.

Step 3 SWOT analysis

- Conduct a SWOT analysis of your organisation to identify specific areas of weaknesses and strengths in your organisation that need to be reinforced for a successful implementation. Refer D7.5.

Step 4 Define goals

- Redefine the goals set in step 1 in a clearly structured document that is understandable to non-experts. The aim in this step is clarity and simplicity.

Step 5 Stakeholder identification

- Identification and analysis of individuals, groups, or organizations who may be impacted by or have an influence on the project as stakeholders.

Step 6 Confirmation

- Check with superiors and stakeholders for consensus on whether to go ahead with the start-up competition. Discuss the idea with the available stakeholders and confirm a consensus, motivation, and commitment.

Step 7 Timeline

- Set a realistic timeline based on available resources and staff. Identify several funding opportunities and prepare the results of step 1 through 6 into a concise document that can be useful to secure official approval and possibly funding.

Figure 3-1: First Stage: Pre-Planning

3.2 Planning

Planning

Step 1 Team setup

- Set up the team and provide a justification for the inclusion of all members. This helps to prevent a bloated, inefficient team and reduces staff stress on the organisers. Define clear roles for each member, identify groups and members with related tasks and dependent deliverables who are intended to work together. Refer D7.5.

Step 2 Competition design

- Decide on the competition formats, available formats include pitch competitions, business plan competitions, hackathons, and demo days. Choose a format that aligns with the defined goals and objectives and is suitable for the target audience. Create a structure for the competition, defining the number of competition stages, number of participants, selection criteria, basic rules of the innovation process, outline the possible competition scenarios, settlement of ties, jury procedures, etc.

Step 3 Time schedules

- Determine the start and end dates of the competition and create a timeline that outlines the different stages of the competition, such as the application deadline, the selection process, the coaching and mentoring period, and the final pitch or demo day. Create a comprehensive time schedule and GANTT charts, with provisions for delays and setbacks. Delegate activities and prepare time schedules.

Step 4 Scouting of participants

- Identify potential start-up prospects and reach out to them early and encourage them to apply. Provide general guidance and clarification on administrative aspects of the application. This allows the interested participants to prepare better proposals and improves the general quality of the competition.

Step 5 Communication and public relations strategy

- Define a clear communication strategy between stakeholders, organisers, jurors, and participants. This should include a plan to manage language barriers where they exist. This must be considered when the official language of the host city is not in use for the competition, or international participants are involved. Promote the competition through different channels, such as social media, email marketing, press releases, and partnerships with relevant organisations and institutions. Reach out to potential participants.

Step 6 Select jury board

- Proceed to select the board of jurors and mentors based on the identified criteria, needs, and areas of expertise. Select judges who have experience in entrepreneurship, investment, and innovation, and who can provide valuable feedback to the participants. Choose mentors who can guide the participants and help them develop their ideas and businesses.

Figure 3-2: Second Stage: Planning

3.3 Implementation

Implementation

Step 1 Call for competitions

- The official invitation to identified potential start-ups will be sent out, and the public relations apparatus will be deployed in full capacity to attract proposals with the right qualities. Higher quantity may increase the quality of proposals received; however, quality should be prioritised over quantity where such trade-offs are required. Create a website for the competition that provides information about the competition, the rules and guidelines, the timeline, the judges and mentors, and the prizes. Create an application form that collects information about the participants and their ideas or businesses in a systematic way.

Step 2 Evaluation of proposals

- Evaluate the proposals received based on the clearly defined criteria in step 4 of the planning stage. This task is to be done by the team of jury.

Step 3 Selection of qualified proposals

- Communicate to successful applications on time, provide information on the subsequent steps required of them. Establish a communication line with all successful applications, for example direct contact with start-up staff in charge of their participation.

Step 4 Development of qualified proposals

- Depending on the competition design, the selected proposals may receive mentoring and guidance from the team of mentors to provide a better fit for the set goals. Keeping in mind the purpose is not to only judge ideas but to identify possibilities and potentials for scalable business models. Provide coaching and mentoring to the participants to help them refine their ideas and develop their businesses. Provide them with access to resources, such as workshops, webinars, and networking events.

Step 5 Presentation of developed ideas in a pitch event

- The most public aspect of the entire competition is the pitch event, where participants demonstrate the viability of their ideas to the team of mentors and the public. This event carries the largest potential for public relations; therefore, adequate preparation must be put in place to ensure success. A designated event manager should oversee the planning and logistics of this event.

Step 6 Selection of recommendations to be implemented

- The team of jurors makes their final recommendations during the pitching event, and the designated number of solutions is selected for further implementation and funding. Final prizes are awarded to winning start-ups. It enhances the visibility of the competition, attracting top talent and generating excitement within the entrepreneurial community. Refer D7.5.

Figure 3-3: Third Stage: Implementation

3.4 Post-Competition

Post-Competition

Step 1 **Piloting of recommendations**

- Ideas that align most effectively with the specified competition objectives and meet the outlined criteria will receive additional support in accordance with the terms and conditions. These successful ideas will be granted further resources to assist in the continued growth of their businesses.

Figure 3-4: Fourth Stage: Post-Competition

4. General Recommendations For Future Replications Based on Lessons Learnt

This chapter presents recommendations choosen from the D7.4 Lighthouse Cities Start-Up Smart City Challenge Report and Lessons Learnt. The D7.5 Supporting Toolkit for Startup Competitions is developed based on these recommendations and as a response to lessons learnt from organising start-up competitions by the LHCs. The recommendations were drawn from an inspection and comparison of the two SPARCS smart city start-up competitions in Espoo and Leipzig. This section targets Fellow Cities that intend to organise similar competitions and at other private or public entities with a similar goal in mind. Some recommendations are axiomatic and are also general theoretical ideals while others are to a certain extent incisive (SPARCS, 2022).

4.1 Competition Workplan

Smart city start-up competitions are organised in cities with workplans that meet the needs of a city. It is recommended that adequate resources are dedicated to define a complete workplan for the start-up competition. See section 3. The four phases, pre-planning, planning, implementation and post-competition, guide one to identify, plan and implement start-up competitions. This also helps to identify the challenges faced during each phase and it is important to ensure that the challenges are properly addressed. A clear idea on the competition should be given to the potential participants at the time of call for competition to ensure that the participants get a proper understanding about the challenge beforehand which helps to attract more participants with a good fit for the theme. The selection of successful applications, filtering participants for further rounds, and the implementation of selected pilot projects are based on different criteria adopted by the organisers. Jurors are experts in the specified areas related to the start-up competition and are a part of the selection team and as well as the mentoring team.

Example: In the Lighthouse city of Espoo, smart city start-up challenge - 'The Sustainable Mobility Challenge' was implemented by KONE and Gaia Consulting. The challenge was based mainly on three topics – micro mobility, shared mobility and multimodal navigation. Proposals from start-up companies were invited followed by a co-design, pitching, and mentoring process. A total of 140 start-ups contacted and out of 10 applications submitted eight start-ups were chosen for the phase two and one proposal was selected for pilot implementation. The start-up competition was carried out as an independent process by KONE, and Gaia consulting was chosen as a subcontractor. Apart from the organisers of the start-up challenge various other partners contributed to the process in varying degree. The jury comprised of five members affiliated to KONE and the City of Espoo. Jury members along with six others comprised the mentoring team. A timeline of four months was required to complete all the three phases of start-up challenge.

4.2 Evaluation Criteria

The selection of successful applications, filtering participants for the further rounds, and the implementation of selected pilot projects are based on different evaluation criteria.

The criterias are categorised as equally weighted criteria and criteria with weighted coefficients. The equally weighted criteria are proportional measures that gives same significance to all the evaluation criteria whereas the criterion with weighted coefficients measures the evaluation criteria non-uniformly with larger weight for the most and lesser weight for least significant criteria. Evaluation criteria with equal weights needs to be used to assess and select proposals for the competition. The criteria with weighted coefficients will be rated on a point-based system from 1 to 5 range for different aspects of the project ideas. The use of weighted coefficients is useful as it allows a more differentiated judgement of specific aspects of the projects. See "D7.5 Supporting Toolkit for Startup Competitions" to know about the past competition criterias used by the organisers (SPARCS 2023).

In this approach, start-ups willing to participate and collaborate with the organisers and mentors are selected for the competition and the focus is exclusively on the outputs of the participants. When designed in line with the defined goals and objectives, certain aspects are awarded more points than others. Such that participating start-ups which usually may not have much previous experience can be evaluated objectively with other criteria. Prior experience in participating in start-up competitions can help participants to undergo self-evaluation which helps them to improve. Indicators addressing the effectiveness of start-up competitions, level of satisfaction, feedback from participants should be examined. This can help in evaluating the relevance of the competition and to minimise the organisational obstacles while organising a start-up challenge. The use of such indicators helps to highlight the results and impacts of the competitions. It is worth noting that weighted coefficients are the standard in procurement processes. However, the final decision on whether to use equally weighted criteria lies with the future implementor of such start-up competition.

Example: In Leipzig, the Smart City Challenge was implemented by the Digital City Unit. The Challenge was framed around three thematic axes: i. digital tourism, ii. urban environmental data, and iii. citizen participation.

Different selection criteria were used for the different phases of proposals. For the selection of participants on the initial round both formal and implicit criteria were used to select proposals. The formal criteria were sustainability, differentiation, scalability, customer value, trustworthiness, inclusivity, and implementation effort. The proposed ideas were first assessed based on the general proposal, the degree of innovation, the realisation potential, the overall understanding of the challenge, the team standing behind the start-up, as well as the overall impression of the pitch deck. The work plan as well as the financial plan were also considered implicit criteria in the evaluation of each proposal.

During the development phase, the four additional criteria composed the evaluation format: progress in further development phase (compared to first stage), were the conditions and tasks from the development phase addressed, realisation potential or feasibility, and scalability. In both phases, each criterion was evaluated in a 1 to 5 scale (5 being the highest). The proposals were evaluated and 3 solutions per challenge were selected based on the selection criteria. Finally, one solution per challenge was selected for piloting and implementation.

4.3 Startup: Capability Maturity/ Staff Strength

The size and maturity of participating start-ups were observed to have an impact on the quality of proposals, and engagement potential of the start-ups. Factors infleuencing the maturity of start-ups include innovative ideas, execution of ideas, scaling capability and flexibilty and ability to respond to change. Start-ups at the beginner level and small companies might face challenges in excelling in start-up competitions due to unestablished business models, limited resources and financial constraints. Participation in such competitions thus poses a significant challenge for them. Proper planning, support from mentors, adequate training and sufficient number of employees can help start-ups progress in competitions. Participation in start-up competitions results in entrepreneurial success and operational profitability, as well as building social networks. For beginners the willingness to take risks also has a positive impact on the success of start-ups.

Example: The start-up challenge in both cities of Leipzig and Espoo received support from partners apart from the organisers. The SPARCS project provided the thematic framework, geographic focus, and support in linking and comparing the process of the start-up competition in the two LHCs.

In Espoo, KONE was the organiser and facilitator of the implementation of the start-up challenge while Gaia Consulting was responsible for reaching out and communicating towards potential participant companies. The jury was formed with five experts from KONE and the City of Espoo for evaluation and twelve mentors were selected to guide the start-ups through the competition process. The City of Espoo took over an advisory role in mentoring and jurying processes.

In Leipzig, Digital City Unit was the facilitator of the implementation of the start-up challenge while Smart Infrastructure Hub and SpinLab linked players and projects together. A jury was formed with nine members to evaluate the start-up competition. There was no mentoring team for Leipzig. Offices of the City of Leipzig supervised and collaborated on the planning and moderation of the development of each respective challenge, filtering, and selection of participants, and directed the mentoring/development phase.

4.4 Understanding Sustainability Concepts

Startups participating in the competition overlooked the importance of sustainability concepts and generating ideas for sustainable smart cities, highlighting a significant inadequacy. Nevertheless, the interesting and diverse proposals meant that sustainability concepts needed to be engaged as part of the process. To address this issue effectively, it is recommended to:

1. Sustainability criteria in evaluation. Ensure that the evaluation criteria features sustainbaility aspect in startup proposals. This can encourage participants to prioritize sustainability in their ideas and solutions.

2. Colloboration with sustainability experts. Facilitating partnerships and collaborations between startups and sustainability experts or organizations can provide startups with valuable insights and guidance on integrating sustainability into startup ideas.

Example: In both the Lighthouse cities Leipzig and Espoo, the main vision of the competition was to view the challenge from three different angels: Environmental sustainability, social wellbeing, and economic sustainability. In, Espoo, the selection criteria also accounted sustainability as one of the evaluation criteria and considered how the idea supports climate targets and foster social wellbeing while being economically sustainable. In Leipzig, the jury members provided expertise in sustainable development, sustainable operations, and environmental protection. The evaluation of the proposals was emphasised on sustainability and customer value. The participants of the competition were sustainability oriented and develop solutions for a sustainable society. The inclusion of sustainability experts in the jury and mentor team proved useful to assess the proposals and provide guidance to the participants on the topic of sustainability.

In both cities an assessment of sustainability of the pilots is possible only after the complete implementation of the project ideas.

5. CONCLUSIONS

In summary, organising a start-up competition is an effective way to boost innovation and help scale smart city ideas into viable businesses that contribute to sustainability goals of cities. These competitions are effective for creating a synergy between city authorities with the business communities within and around their cities, they also serve as a form of citizen engagement during procurement and adoption of smart city solutions by the municipalities.

Integration of the private and public sectors can lead to the participation of a wide range of private partners in city planning and development. It ensures value for investments through better competition between potential private partners. Adapting engagement with partners in accordance with the city's objectives promotes a wide range of opportunities and scope for sustainable development at city level. Training and competence development are essential to ensure that city representatives are appropriately equipped to engage and identify the available public-private partnership tools. The use of a range of mutually beneficial engagement tools, such as financing and technical assistance, can help maintain a good relationship with the private sector. Flexibility to adapt different approaches at city level will ensure fit for purpose and maximise the impact of the collaboration. Start-up competitions are a perfect example for public private engagement. These competitions promote ideas of the participants as inclusive and responsible business through integration of public-private engagement. Complex challenges involving a wide range of stakeholders often require complex solutions to sustainable development which can be achieved by ensuring multi-stakeholder partnership.

This paper provides a comprehensive guide for cities and organisations aiming to execute a successful start-up competition within the theme of smart cities. It has emphasised the importance of a clear definition of goals early in the planning process, engaging stakeholders, leveraging appropriate technology platforms, and ensuring fairness, transparency, and accountability throughout the process. Other key considerations when planning a start-up competition are objectives, detailed plan, competition design, finance, legal obligations, event management, communication, partners, and jury board. The prize in a startup competition serves as a powerful incentive, motivating participants to strive for excellence and innovation. It can significantly impact the success and outcome of the competition, as it often provides crucial resources, funding, and recognition for winning startups, while also serving as a valuable tool for public relations, showcasing the competition's impact and promoting its brand image.

Overall, start-up competitions are a powerful tool in promoting innovation and entrepreneurship. By utilising the toolkit of guidelines and recommendations provided in this paper, organisations can create a successful start-up competition that benefits all stakeholders involved. By following the guidelines and recommendations outlined in this paper, organisations can increase the chances of creating a successful start-up competition that supports the growth of the smart city ecosystem. Additionally, the paper serves as a valuable resource for start-ups looking to participate in these competitions, as it provides insight into what to expect and how to prepare for such events.

6. ACRONYMS AND TERMS

AR	Augmented Reality
FC	Fellow City
FHG IAO	Fraunhofer IAO
IOT	Internet of Things
IT	Information Technology
LHC	Lighthouse Cities
SME	Small and Medium Enterprises
SPARCS	Sustainable energy Positive & zero cARbon CommunitieS
VR	Virtual Reality

7. LIST OF FIGURES

8. REFERENCES

SPARCS (2022). *D7.04 Lighthouse Cities Start-Up Smart City Challenge Report and Lessons Learned*. https://sparcs.info/en/deliverables/d7-04-lighthouse-cities-start-up-smart-city-challenge-report-and-lessons-learned/

SPARCS (2023). D7.5 Supporting Toolkit for Startup Competitions. https://sparcs.info/en/deliverables/d7-5-supporting-toolkit-for-startup-competitions/