The Urban Lab of Europe!

JOURNAL

PROJECT

RESILIO - Resilience nEtwork of Smart Innovative cLImate-adapative rOoftops

Amsterdam, The Netherlands

TOPIC

Climate adaptation

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RESILIO's Journal #2: From planning to development

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Executive Summary

This is the 2nd Journal article describing progress of the RESILIO activities and associated implementation challenges. The purpose is to provide a nuanced discussion on the process followed along the project rather than providing a factual description of events. It, therefore, cross-checks progress made against seven identified implementation challenges/risks. In the 1st Journal edition, this was done too. As such, an evaluation of how implementation challenges/risks where dealt with over time provides interesting insights into how Blue Green innovations can be effectively managed by Amsterdam. This evaluation can offer lessons to other cities that aim to innovate.

From planning to development

RESILIO is completing its second year since the kick-off of the project. Journal #1 was written at the time of planning a series of activities: citizen and stakeholder engagement plans were being developed, organizational arrangements between partners were being made to clarify dependencies in the work (e.g. construction and scientific observation), but most importantly, roofs had not yet even been tendered.

Essentially, the transition period between having a funded project to having a project with very clear roadmap was received with a lot of enthusiasm by partners, but was also associated with plenty of uncertainty. For instance, how would the roofs be procured, would citizens and building residents welcome the development, would the experimental setup work fine and would results point to the anticipated positive environmental outcomes?

This period of uncertainty – almost – belongs to the past. The procurement of most roofs has been successfully completed, the construction of 5 out of the 8 roofs has started, and one has already been completed. Some technical challenges have surfaced but the project is developing contingency plans to resolve them (discuss in sections 2 and 3). The engagement plan has been executed and amended accordingly to deal with corona-related restrictions. Scientific observations point to the expected results, although longer observation records are needed. Finally, a Cost-Benefit Analysis is being developed to support the business case for upscaling; moreover, possible business and governance models are being explored.

Implementation Challenges

UIA's experience in running innovation projects in cities has allowed identifying some reoccurring challenges.

These are classified under seven categories, ranging from organisation to technical issues that can occur. Table 1 provides a summary of these challenges as well as a qualitative assessment of their relevance at this stage of the project and the criticality of the challenge. The challenges are described in more detail in section 3.

Table 1. Characterising RESILIO's implementation challenges

Challenges	Current Relevance	Challenge Level	Key Observations
Leadership for implementation	Low	Low	• Partners have established clear and effective communication channels (despite need for Corona virtual planning). • Changes in personnel reported before (journal 1) have been completed. New staff have assimilated completely – including new assistant project manager (PM). Moreover, health-related absence of lead PM was effectively dealt with by the urban authority. • Successful leadership is evident: roofs have been procured at a reasonable budget and with reasonably little delay (see below more on procurement). • Scientific partners are in line with scheduled work and construction is under way.
Public Procurement	High	Low	• Cost uncertainty reported before (journal 1) has been dealt with. Procurement was completed for 6/8 roofs and 2/8 ongoing. • Some new certified materials allowed cheaper delivery. • One project partner (Consolidated) had to leave the partnership to be able to work as subcontractor. • One tender awarded to Consolidated and two not. This is a good sign of transparency of the tender process as well as of healthy competition and ability of the project to attract interest.
Organizational arrangements within the urban authority	Low	Low	• As mentioned previously, the horizontal umbrella municipal "Programme on Climate Change Adaptation" aligns this project with overall city strategy. • Other departments have aligned with the project's idea (Planning & Sustainability, Health, Public Space departments). • The project attracted the city's biodiversity expert after recognising importance for target beneficiaries (see challenge below)
Participative approach for co-implementation	Low	Low	• The Cost Benefit Analysis (CBA) has led to high levels of integration and communication – effectively coordinated by the VU (task in progress) • It remains a question how the CBA will lead to a sensible business case. • A business model will be required in the future (e.g. Public-Private Partnerships? City funding?) – see upscaling below

			• Measurable targets draft prepared after UIA request and approved after iteration with UIA. • Only minor delays in the project's advancement (see procurement of 2/8 roofs). Knock-on effects from the delay in procurement to construction.
Monitoring and evaluation	High	Medium	• Scientific monitoring of heat measurements in and out of the building, effectiveness of solar panels is on-going. • First scientific monitoring results are in the right (expected) direction but conclusive findings will be published in the next year after hot day observations. • Last roof location awaited procurement results on other locations before actually procuring. Now this task has been advanced for roof 7/8 and roof 8/8 will be procured last).
Communication with target beneficiaries	Low	Low	• Multiple communication media exploited (moving BG roof model on bike, website, social media) • Messages adopted to match resident profiles (persons) • Personal stories in the style of Humans of New York on how they think BG roofs will change their neighbourhood. • Innovation lab opened to the public as planned, yet corona related restrictions meant that engagement had to move online. • Online engagement proved hard (low turn-out) despite enormous efforts to attract attention • Presentation of the project took place at the (i) Climate Adaptation Summit, (ii) the Rooftop Symposium, and (iii) the Amsterdam International Water Week focus event. Smaller events also took place, e.g. at neighbourhood scale.
Upscaling and Transferability	Medium	High	• Grant scheme for private roofs opened to the public and has been successful in covering the planned 2,000 sqm. Budget also remaining for additional coverage. • Applicants included a museum (the tropical institute of Amsterdam), a new housing development and a housing corporation. These cover different roof sizes. • Upscaling model to see the expansion of roofs beyond those funded by the project: no complete business case built to support it (in progress). This is a critical component supporting the sustainability of the approach. • Project has set the ambitious target for deep knowledge transfer in three cities, e.g. through a pre-feasibility study. Engagement already taking place with the UIA projects of Manchester (IGNITION) and Seville (CartujaQanat), as well as other cities (Graz, Berlin) – though no agreement for closer collaboration has been made yet.

Project Status

Measures against Covid19 initially disrupted the flow and coordination of RESILIO activities. However, this did not last for more than two months. All project partners (and particularly the Urban Authority) showed great levels of adaptiveness and ability to collaborate virtually. Many activities moved online and the procurement process was effectively prepared. Most tenders went through as planned and construction of 5 out of 8 roofs has started and 1

has already been completed. Technical challenges were met in one of the roofs that started construction due to engineering recalculations required (construction pending or alternative site will be selected). The eighth roof will also be procured in the first quarter of 2021. The Innovation Lab was setup and was even open to the public during the period between the two lockdowns in the Netherlands. A second Innovation Lab is being constructed at the moment.

Overall, some delays have been observed but they did not apply to the entire roof development phase – only for some roofs. This had an unintended benefit: it allowed gaining some experience in one site and transferring to the construction of another. For instance, the setup of the capillary system connecting the blue and green layer proved a challenge in the first roof but not in the subsequent developments.

Public engagement is perhaps the activity most affected by covid19 related restrictions. Physical events at the roofs, the innovation lab and on the streets were really successful with citizens showing a lot of interest in the proposed solution. Their participation was active and it allowed them to express their interests and concerns about the solution (e.g. biodiversity). However, lockdown forced RESILIO to engage solely through digital means. Despite the intense communication effort, turnout in digital events was sub-optimal. People's fatigue from engaging with screens is likely to have affected.

Experiments are currently being run to demonstrate the thermal insulation potential of the scheme. Temperature are measured at the roofs and within the buildings; while the first results are pointing to the anticipated improved performance (against a reference roof with no BG component), more extensive data collection is needed to provide a thorough performance analysis throughout the year. The summer of 2021 will provide valuable data. As for the contribution of BG roofs to flood risk reduction, this has been examined thoroughly already through modelling. An additional modelling analysis included the assessment of a scenario where more BG roofs are developed – this showed a synergetic effect in flood depth reduction.

All the aforementioned data are useful to provide an evidence based CBA. For this reason, the project has recently requested for an extension period that would allow for better documentation of the RESILIO benefits.

Challenges explained

Exploring RESILIO's advances and challenges along the way allows to:

1. to identify what types of problems can arise in such innovative projects,
2. to reflect on them, and ultimately
3. to develop a response to them.

This reporting is beneficial for the external readership, particularly policy- and decision-makers, so they know what to anticipate when engaging with similar infrastructural endeavours and plan accordingly.

Challenge 1. Leadership for implementation

The project has been successful in terms of leadership on behalf of the urban authority as well as individual partner organisations. This has been made possible thanks to the well-defined roles in the project and clear management rules. The technical ability of involved partners has been instrumental as this meant that they can timely deliver high quality work. A new assistant project manager joined (replacing the previous one) and she has supported the smooth transition over to digital and remote working. In particular, the period of absence of the PM was dealt with effectively by the municipality and the assistant PM. Consortium and steering meetings have helped partners stay connected with the activities of their counterparts. Delays and their impacts have been mitigated, as for example through the request for extension in order to collect critical monitoring data.

Challenge 2. Public Procurement

This has been a major issue of concern and uncertainty from the onset of the project. Would the housing corporations have the capacity to procure on time and with the right specs? Would enough tender offers be submitted? Would the cost estimates be accurate? In most cases, the answer is "yes". With the exemption of one roof, the remaining seven have been procured and a competent party has taken the responsibility to construct according to plan. By the end of the present quarter, 3 out of 8 roofs will have been delivered. 4 will be delivered in the second quarter and the final roof in Q3. Delays were caused due to technical challenges, rather than administrative barriers.

Partner Consolidated chose to leave the consortium in order to be able to participate in the bidding process. They have been successful of securing a contract but not for all roofs. Two tenders were awarded to an alternative partner; this is a good sign of transparency of the tender process as well as of healthy competition and ability of project to attract interest.

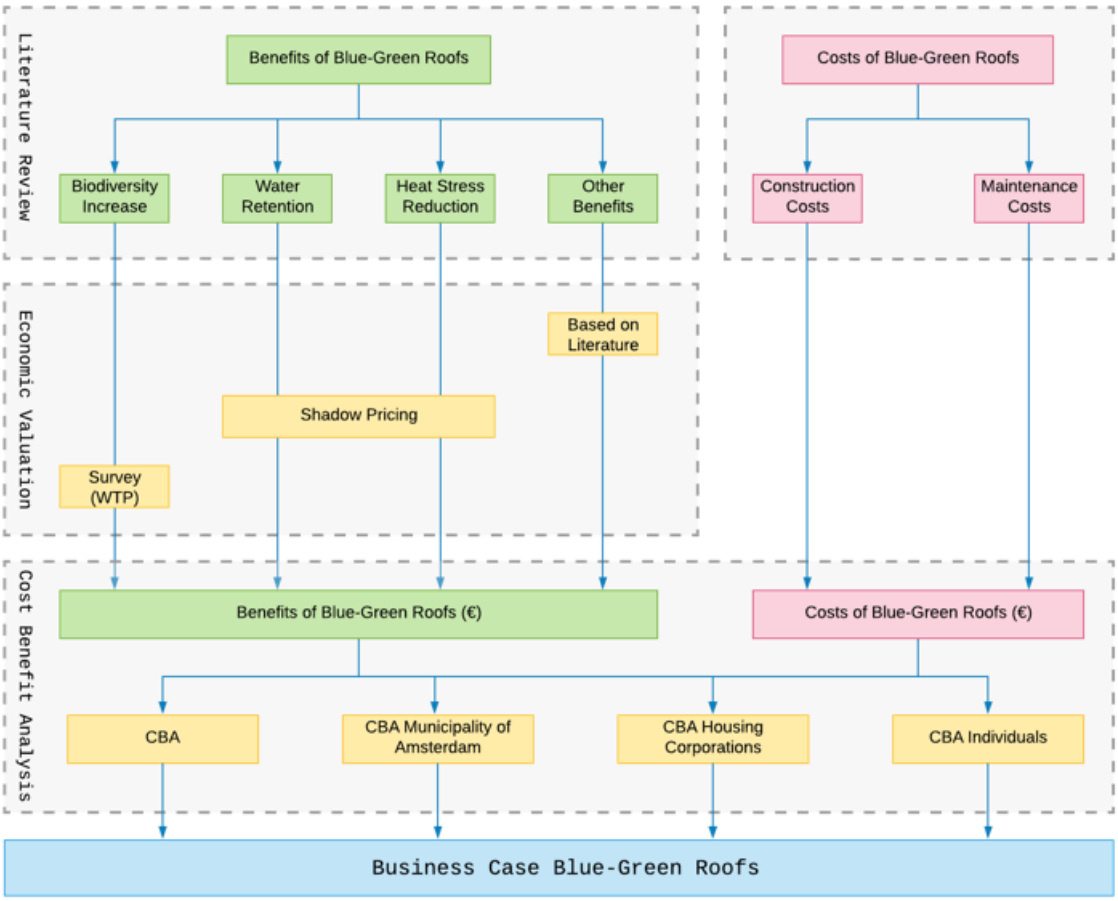
Challenge 3. Organizational arrangements within the urban authority

Amsterdam does not treat RESILIO as a standalone project. Instead, RESILIO is integrated in a long-term plan for adaptation which cross-cuts municipality departments through the "Program on Climate Change Adaptation". This program forms part of the city's development strategy. Moreover, while RESILIO sits under the urban planning & sustainability department, cross-departmental collaborations allow for building synergies, e.g. as mentioned above, the project attracted the city's biodiversity expert after recognising importance for target beneficiaries.

Challenge 4. Participative approach for co-implementation

Tasks within the project have clear dependencies and require timely and accurate information flows or delivery steps, e.g. measurements cannot take place before the construction of the roof, the roof cannot be constructed before procurement and successful bidder selection, bidding cannot be performed without specifications. The partners have been truly efficient in managing the aforementioned interdependencies.

One activity which merits special mentioning with respect to effective collaboration is the undertaking of the Cost Benefits Analysis (CBA). Partner VU integrates knowledge through providing valid methodologies to account for the benefits and monetizing those. The Figure below shows how not only technical dimensions are considered but also social dimensions relating to recreation or biodiversity benefits (e.g. through Willingness to Pay technique). A positive CBA or better return on investment compared to alternatives remains to be demonstrated. On the basis of the CBA, RESILIO aims to demonstrate there is a business case proposition. It is worth pointing out that this is different from having a business model which would actually be required to translate the business case into a market solution.



Challenge 5. Monitoring and evaluation

The original proposal application developed by Amsterdam had set overall goals without tangible and measurable targets (as there was no application requirement). UIA requested that such targets would be developed in the second year of the project; as such, this had led to a successful and comprehensive list of indicators approved after iteration with UIA. It is worth mentioning that setting a target goal is a challenge for innovation projects as they themselves develop research in the domain for the first time, e.g. expected reduction in indoor temperature cannot be very accurately predicted, despite the availability of specialised modelling tools.

As such, the performance against KPIs is supported by monitoring of heat measurements in and out of the

building is on-going. First scientific monitoring results are in the right (expected) direction but conclusive findings will be published in the next year after hot day observations.

Monitoring of the rate of roof delivery suggested that there were only minor delays in the project's advancement; two out of eight (2/8) roofs are procured later than expected. This clearly has had knock-on effects from the delay in procurement to construction delays.

Challenge 6. Communication with target beneficiaries

RESILIO has given particular attention to communication with citizens and key stakeholders, such as residents and asset owners. The latter refers to both private roof owners as well as the housing corporations who own and manage the roofs in the housing estates.

RESILIO has engaged with the wider public and residents to raise awareness on the project and its social and environmental benefits. It has also allowed room for gaining knowledge about the priorities of these groups. For instance, as mentioned above, biodiversity ranks high in the priorities of citizens and hence the project responded accordingly to this. It is important to point out that RESILIO aimed for a targeted communication by identifying the characteristics of the beneficiaries, e.g. demographic characteristics. This allowed the project to tailor the messages to attract attention. Particularly innovative was the use of personal stories in the form of "Humans of New York" narratives – this storytelling approach helps people relate to the roofs through a human dimension rather than through science alone.

While residents saw the benefits of the roofs, there were concerns expressed on the safety of the approach, e.g. would water escape and flow in the building? RESILIO had been proactive to bring specialists who provided expert opinion in order to address these concerns.

A Zoom-In article is currently under development to discuss in more detail the importance of timely engaging with the public in a truly two-directional way. This is a lesson from RESILIO's BG roofs which is immediately transferable to other BG Infrastructure projects.

In terms of communication with other cities, scientists and practitioner, a series of presentations took place: (i) Climate Adaptation Summit, (ii) the Rooftop Symposium, and (iii) the Amsterdam International Water Week focus event. Smaller events also took place, e.g. at neighbourhood scale.

Challenge 7. Upscaling and Transferability

Upscaling refers to the ability to see more RESILIO roofs within Amsterdam in the coming years, either as part of the program or after the completion of RESILIO. Within the program, UIA is co-funding the delivery of private roofs through the announcement of a grant scheme. The project opened a call for application for such RESILIO private roofs. The call has been successful in covering the target value of 2,000 sqm. Successful applicants include a museum (the tropical institute of Amsterdam), a new housing development and a housing corporation (unlike the other housing corporations, this is not part of the project partnership). These three private roof schemes will cover different roof sizes.

The project is currently developing an upscaling model to see the expansion of roofs beyond those funded by the project; the business case development to support it is in progress. This is a critical component to strengthen the sustainability of the approach beyond the duration of the project.

Finally, in terms of knowledge and technology transfer, the project has set the ambitious target of "deep engagement" with at least three cities, e.g. through a pre-feasibility study using the knowledge acquired over the last three years. Engagement is already taking place with the UIA projects of Manchester (IGNITION) and Seville (CartujaQanat), as well as other cities (Graz, Berlin) – though no agreement for closer collaboration has been made yet.

Concluding remarks

RESILIO is entering the last year of its life – although the roofs are here to stay. There are clear indications that this is a project which will demonstrate in practice the anticipated benefits and, therefore, will leave a legacy in terms of learning. It will also leave a great legacy for the buildings that will have a state-of-the-art system providing climate adaptation using a space otherwise forgotten. What is remaining is to convert this knowledge into a "business package" that can be adopted for upscaling and transfer so more similar roofs can be developed in Amsterdam and beyond.

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This is the second journal of a three-year series between 2020-2022 presenting progress and the implementation

challenges of RESILIO.

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