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AN ANALYSIS OF AMSTERDAM'S "STARTUP IN RESIDENCE" PROGRAMME

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ABSTRACT

ENGLISH

Can city administrations benefit from the entrepreneurial spirit of startups, and create better urban solutions with their help? In this paper, we critically assess the interplay between startups and city administrations for city-driven innovative public procurement or “challenge-based procurement” policy, taking Amsterdam’s Startup in Residence (SiR) programme as a case study. We describe and analyse this programme from two perspectives: i) the economic development perspective, i.e. does it promote startups and does it bring them new business opportunities, and ii) a governance perspective, i.e. does it bridge the gap between startups and the city bureaucracy; does it lead to a more innovative culture within city government.

NEDERLANDS

Kan het stadsbestuur profiteren van de ondernemingszin van startups, en deze inschakelen om betere oplossingen voor grootstedelijke problemen te bedenken? In dit rapport onderzoeken we hoe de gemeente Amsterdam, via haar programma “Startup in Residence”, probeert om dit te bereiken. We beschrijven en analyseren het programma, en gaan na wat de effecten zijn op startups en gemeentelijke afdelingen die met het programma meedoen, en of het programma bijdraagt aan een innovatievere cultuur binnen de gemeente.

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1. INTRODUCTION

During the last years, there has been a shift in some "smart city" discourses from global corporate actors to local startup companies. A growing number of city administrations are exploring how to engage startups in the development and implementation of new solutions for urban challenges, ranging from reducing bicycle theft, separating waste streams more effectively, to promoting tourism beyond the city centre, etc. By tapping into local entrepreneurial talent and ecosystems, they hope to improve urban quality of life, and simultaneously promote the local entrepreneurial scene, by opening procurement budgets and experimentation opportunities to startup companies. San Francisco, Barcelona and Amsterdam are frontrunners in this respect, and many other cities are starting to adopt a similar approach. This approach is a special case of "public procurement of innovation", a topic that has gained attention among local administrations and other policy levels. It has a prominent place in the EU Urban Agenda, and a number of European cities have created a partnership to develop new ideas, exchange experiences and develop recommendations for national and EU legislation (Partnership on Public Procurement, 2017).

In this paper, we critically assess the interplay between startups and city administrations for city-driven innovative public procurement or "challenge-based procurement" policy, taking Amsterdam's Startup in Residence (SiR) programme as a case study. To run this programme, an intermediate structure between the city departments and local startups was set up. It is charged with the tasks of collecting and (re)defining relevant challenges from the city departments, organising a competitive process in which startups can bid to develop solutions, and guiding/supporting the selected startup for each challenge to co-develop and implement the solutions in connection with the relevant city department. Our aim is to analyse this programme from two perspectives: i) the *economic development* perspective, i.e. does it promote startups and does it bring them new business opportunities, and ii) a *governance perspective*, i.e. does it bridge the gap between startups and the city bureaucracy; does it lead to a more innovative culture within city government.

To analyse these issues, we start (chapter 2) by summarizing the literature on innovative public procurement, that sheds light on the question of how public organisations can enhance their own performance through innovative procurement, how suppliers are affected and to what extent innovative procurement is an effective economic policy tool to promote innovation. Next, in chapter 3, we describe the background and context of Amsterdam's SiR programme: why was it started, how is it framed legally, and what are the ambitions and expectations. After that, we analyse how it works in practice, based on desk research and a number of face-to-face interviews with startups (at different development stages), "client" city departments, the legal department, mentors, and people involved in the programme management (carried out during August-September 2017). Based on these sources, we analyse the distinct stages in programme: the needs articulation process and bidding process (chapter 4), the in-residence period (chapter 5), and the aftermath of the in-residence programme (chapter 6). Then, in chapter 7, we assess the overall impacts of the programme regarding local economic development and governance. Chapter 8 draws conclusions.

2. LITERATURE REVIEW

In most countries, local governments are responsible for many public tasks, including (although there is substantial variation between countries) urban planning, the maintenance of public spaces, welfare provision, waste, mobility management, safety and security, elderly care, education, etc. These tasks are typically performed by dedicated city departments and units, responsible for specific realms. The main decisions and strategies are set on the political level, but for the implementation, the city frequently engages with suppliers (companies, semi-public bodies) in a variety of ways (long-term contracts, one-off purchases, subsidies). In all, city governments are heavy spenders, making large sums available for the construction of buildings and infrastructures, maintenance, IT services, facilities, welfare services etc. Hence, the quality of the purchasing process has an impact on the quality, innovativeness and cost of urban services.

A recurrent challenge regarding the purchasing strategy of municipalities is how to deal with innovation. The market develops a never-ending stream of new solutions – e.g., new types of traffic lights, new IT systems, new "smart" infrastructure, etc. – that might be of interest for the city to buy, but also entail risks and uncertainties; on the other hand, it may well be that a city needs a very specific innovative solution that is not yet on the market and needs to be developed. Therefore, innovative procurement can bring benefits for the city in several respects: it may improve public services and infrastructures, and/or reduce costs, and also, it can promote the local economy by incentivising (local) firms to develop innovations that they may also be able to sell elsewhere (Edler & Georghiou, 2007).

Allman et al. (2011) make a distinction between *triggering* and *responsive* demand for innovation. *Responsive* demand for innovation happens when the buying organisation – the city in this case – responds to innovations on the market (new to the buyer); this is problematic as in many public organisations, procurement is considered to be a too rigid process to keep up with technological advancements (Weiss, 2014). *Triggering* demand for innovation happens when the buying organisation actively evokes market players to develop a specific innovation that services its needs; the innovative solution can be developed by suppliers in-house, or in co-operation between the public organisation (as user) and the suppliers, where interactions can extend towards user-producer interactions to actually co-produce the solution up to a prototype (as explained by several studies on user-driven innovation, e.g. Prandelli, Sawhney, and Verona, 2008; Von Hippel, 1986).

Yet, triggering an innovation through procurement requires that public organisations are able to understand, define and clearly express their future needs, and to interact with potential producers in a way that stirs market interest. As we will see later in this paper, Amsterdam's SiR programme is a case of triggering: startups are asked to develop solutions for specific challenges defined by several city departments, and to develop solutions in a process of co-creation. On a general level, there are several barriers that can limit the triggering of innovation through procurement. For example, Lember, Kattel, and Kalvet (2015) underline that public procurement is often highly decentralised and fragmented: each (city) department or agency has its own, relatively small budget and enjoys a high degree of autonomy. This results in a lack

of scale, making and effective triggering of innovations more difficult: companies are less willing to make specific investments to create an innovation for a small, one-off assignment. However, this may be less of a restriction for early stage startups, as having a first client can be important.

Innovations may be in different development stages, and have different features as well. Edquist and Zabala-Iturriagagoitia (2012) introduce three types of Innovative Public Procurement (IPP), based on the character and development stage of the innovation:

- Pre-commercial procurement (PCP): here, the buyer does not buy a product, service, or solution, but rather a precursor to that. It may include the development of a product prototype (but no actual product development), or research outcomes generating relevant knowledge that might be used in the organisation. This type of IPP can be seen as direct public R&D investments.

- Adaptive IPP: here, the solution procured is an incremental innovation, new to the buying organisation and adapted to the specific local conditions. It may also be labelled 'diffusion oriented' or 'absorption oriented' IPP.

- Developmental IPP: this involved the creation of completely new solutions as a result of the procurement process. It can be regarded as 'creation oriented' IPP and involves radical innovation.

Edler and Georghiou (2007) identify a number of conditions required for the implementation of innovative public procurement. First, there is a need for *co-ordination across government*, to avoid fragmentation and also to capture and value the social returns that are not necessarily within the ambit of the purchasing department: in other words, is the public sector ready to pay a premium cost or bear some efficiency losses in return for better addressing societal needs such as sustainability, social inclusion, etc., and who bears the costs? (McCrudden, 2004; Edler & Georghiou, 2007). Second, *there must be an effective process of co-creation between buyer and supplier prior to and during the innovation process*. Many innovations will only succeed when there is a high level of interaction and co-design. Third, there is a *need for a changed practice of procurement professionals*; they must be ready to accept more risk – there is a higher chance of failure compared to traditional "off the shelf" purchasing, and they must have competences and skills to engage in a co-creation process with the supplier. Additionally, a complicating factor hindering IPP is that public sector purchasers consider the EU directives on public procurement as complex and difficult to interpret (Knutsson & Thomasson, 2014) and thus have a tendency to play it safe in order to avoid court appeals.

Therefore, during the innovation process itself, the co-operation between buyer and supplier is key. Edquist and Zabala-Iturriagagoitia (2012) elaborate on this aspect, stressing that cooperation can be relevant for the entire process of procurement, but may also apply to only one or more stages in particular. The typical IPP process can be divided into the following stages (adapted from Edler et al., 2005; Expert Group Report, 2005):

1. Identification of a grand challenge (or a public agency/mission need), and its formulation in terms of a lack of satisfaction of a human need or an unsolved societal problem;

2. Translation of the identified challenge into functional specifications;
3. Tendering process: (a) Opening of the bidding process through a tender. (b) Translation of the functional specification into technical specifications by potential suppliers. (c) Submission of formal bids by potential suppliers;
4. Assessment of tenders and awarding of contracts;
5. Delivery process: (a) Product development. (b) Production of the product. (c) Final delivery to the purchasing agency.

Unlike in traditional purchasing processes, in this sequence, it is assumed that the purchasing organisation is able to specify in general terms what it needs (in step 2), but leaves the technical specifications to be elaborated by the supplier; also, on the top of that, the delivery process contains an R&D stage.

The role of SMEs in public procurement

IPP processes may range from involving large companies to a micro-businesses in developing innovations. The key question of this paper is how startups can contribute to solve urban problems and challenges, and what their role is in IPP processes. Related to public purchasing in general, it is widely recognized that there are barriers that make it more difficult for small and medium-sized enterprises (SMEs) to obtain – and look for – procurement contracts from (local) governments. For example, smaller suppliers tend to have a negative perception of the tendering process (MacManus, 1991) and prefer to supply private firms rather than the public sector (Purchase, Goh, & Dooley, 2009). In an overview, Flynn and Davis (2016, p. 561) list a number of hurdles: i) excessive bureaucracy (Cabras, 2011), ii) problems to navigating the procedural aspects of tendering (Fee, Erridge, & Hennigan, 2002; Greer, 1999; Loader, 2005), iii) costly tendering in terms of money and time (Flynn, Davis, McKevitt, & McEvoy, 2013), iv) too large contract sizes and information asymmetries (Bovis, 1996; Smith & Hobbs, 2002). Moreover, there are indications that smaller suppliers lack the administrative capacity and legal expertise to succeed in tendering (Karjalainen & Kemppainen, 2008); they lack human resources, and are less proactive in engaging with public buyers (Flynn, McKevitt, & Davis, 2015). These barriers result in low success rates for SMEs. In 2010, the share of SMEs in above EU threshold contracts was 33% (against their 99.8% presence in the population of EU enterprises) (GHK, 2010). At the same time, policy makers on different levels want to contract more to SMEs and startups; they recognise their innovation potential to solve new pressing urban challenges and, at the same time, public procurement is increasingly perceived as a tool for local/regional business development and innovation in urban economies (Van Winden & Carvalho, 2015).

SUMMING UP

The key question in this paper is to analyse how startups can play a role in addressing city problems and new pressing urban challenges of various kind. The literature reviewed suggests that a successful IPP programme – namely targeting startup innovation – should fulfil the following conditions:

- It should have a mechanism in place to identify relevant challenges;

- The tender must be open enough to allow for innovation (few detailed specifications);
- It should reduce complexity and costs for startups to join public tenders (shall result in more startups participating);
- It should have a well-designed yet flexible co-creation process (will result in better solutions);
- It should offer scope for scaling beyond the one-off solution (for the startup, this will result in business development; and the city might replicate the solution in other urban domains);
- It should include incentives for a changing procurement behaviour from the buying organisation/departments (i.e. accepting more risks, putting effort in the co-creation process);
- An intermediary organisation is needed to guide this transition (from specs-based to IPP regimes) and co-ordinate the actions of the many players involved.

Before assessing whether these conditions have been met, and whether they influenced the results of the Amsterdam SiR programme so far, in the next section we look into the nuts-and-bolts of the initiative.

3. STARTUP IN RESIDENCE AMSTERDAM (SIR)

3.1 PROGRAMME´S RATIONALE AND DESIGN

SiR took off in 2015. A political delegation of the city of Amsterdam had visited San Francisco and the Bay Area, and found San Francisco's "Entrepreneurship in Residence" (e.g. Wood, 2013) programme very inspirational. Back home, the responsible alderman decided to develop a similar programme. The city's recently founded innovation department – the Chief Technology Office (CTO) – considered it as an opportunity to promote Amsterdam´s entrepreneurship ecosystems and, at the same time, renew the municipal bureaucracy's culture by infusing it with a more dynamic "startup" mindset. The idea was elaborated to invite startups to develop solutions for a number of urban challenges, to be defined in advance by Amsterdam municipal departments.

Table 1: Facts & figures

	Number of challenges	No. of startups applying to SiR	No. of awarded startups
2015	7	85	7
2016	10	90	7
2017	13	85	13

Source: SiR

The SiR programme roughly works as follows[1]. As a first step, city departments are invited to formulate challenges (helped by the SiR programme management team) that they want to address. Next, these challenges are published online, and startups are encouraged to submit proposals to tackle them in an innovative way; after they have pitched their ideas or concepts, the best ones are picked by a selection committee (consisting of people from the city departments, the leader of the SiR programme, and an expert/mentor). The selected startups then enter a 5-month period in which they must elaborate their solution, in close collaboration with the city department. During this "in residence" process, they receive support in the form of mentoring (by seasoned entrepreneurs, coaches, and peers) and education and training (e.g. on business model development, legal issues, understanding how the municipality bureaucracy and procurement works, etc.). Also, selected startups may receive small financial support to develop their solution and concept further (e.g. to buy materials, small infrastructure and equipment, etc.). By the end of the term, they are expected to have their solution up and ready.

1 For a short explanation video, see https://startupinresidence.com/#

If the client (i.e. the city department that defined the challenge) is satisfied, it may enter in a contractual relation with the startup.

Since 2015, an edition of SiR runs every year. Table 1 shows the number of challenges defined in SiR, the number of startups that applied, and the number of awarded startups; table 2 provides some examples of urban challenges as defined by the city departments (in collaboration with the SiR management structure). The programme was run by a small team of two people, both are employed at the Chief Innovation Office.

Table 2: Some examples of urban challenges

Challenge	**City department/programme ("client")**
Find an effective way to reward desired behaviour, starting with a reward system for cyclists to encourage them to park their bikes a bit further from their destination in designated spots.	Programme Rembrandtplein, Traffic & Public Space
Increase the waste separation rate and create a sustainable solution so that by 2020, the municipality will achieve a separation rate of at least 75% of the total internal waste streams of the municipality of Amsterdam.	Facility Bureau
Develop a tool to enable canal users to contribute to a smooth passage and safe sailing, even at peak times.	Waternet (Water company)
Offer us a solution, tool or system to facilitate the local reuse of reclaimed (construction) materials, monitor the resulting process, and, as a possible result, create new jobs.	Public space & sustainability

Source: https://startupinresidence.com/social-issues/

3.2 THE LEGAL CONSTRUCTION BEHIND SIR

The programme is not only innovative in linking local economic development (i.e. promoting startups) with promoting cultural change in the city bureaucracy (i.e. infusing a spirit of innovation into the city departments that work with the startups). An important new aspect of the programme is also the way through which it “opens” public procurement to startups, by offering a smoother and somehow easier access to local government contracts in a legal construction that fully abides with European procurement legislation (Directive 2014/24/EU).

At the very beginning of the design of SiR, there were intense discussions between the city’s Chief Technology Office (CTO; the city department that took the initiative for SiR) and the city’s

legal department on how to set up SiR, in particular if and how SiR would need to comply with European procurement legislation. In the end, it was decided that full compliance would be needed to prepare for the case in which a successful startup, by the end of its in-residence period, would be awarded with a contract in excess of the threshold for which European tendering rules apply (for 2018, € 221,000 excluding VAT). An official from the city's legal department was highly committed to make SiR work, and found a way to work creatively within the existing European and national procurement regulation.

As European-level procurement procedures are potentially complicated, which could hinder the appeal of the programme for startups, it was decided that the standard guide for European tendering would be used "in the background" only: startups would hardly notice the heavy bureaucratic jargon but it would comply with all the legal obligations. The process works as follows. The city writes an umbrella-like call for tenders, that include all the challenges of the various participating city departments combined, and publishes it officially. In the call, each challenge represents a "lot", and firms may apply for all lots at the same time, but also for individual ones (according with the European procurement law, this is to allow SMEs to participate in large calls). Also, procurement law allows the city to define "suitability requirements" that outline what type of firms are suitable to apply to the call, or the lots of the call – this enables the city to restrict the type of tenderers to startups. The duration of the buying option by the city (after the 6-months in-residence period) cannot be infinite, so that was capped at 3 years, in which the city gets a preferential buyer status for the developed solution.

As explained, during the in-residence period, startups do not offer a solution that fits a detailed set of specifications. Rather, they are expected to innovate and co-develop it with their "client", i.e. the city department that seeks to address a particular challenge. European procurement law allows for some degree of collaboration between buyer and supplier in the design stage (and the national procurement law of 2016, drawing on the 2014 EU directive, made that even easier). Legally speaking, the city administration assigns the startup firms to develop a prototype, with an option of purchase if it fits. The small sums of development money that some startups may receive during their in-residence period are not a subsidy, but part of this assignment (the SiR programme asks the assigning department to reserve € 10,000 per startup for this purpose).

4. DEFINING THE URBAN CHALLENGES: THE NEEDS ARTICULATION PROCESS

How did all this legal and organizational apparatus worked on the ground? To start with, for most city departments, it is not common to work with startups. Most of their contracts are with established, larger companies. A first key challenge of the SiR programme was to convince leaders in various city departments that working with startups could bring added value, in the sense of new solutions, but also of "contagion" with the more innovative and agile culture of startups. An internal campaign was launched to raise awareness of the programme within the municipality, and the programme leader of SiR put a lot of effort to talk personally to representatives of various departments. In the first round of SiR (2015), it turned out that there was considerable interest to work with SiR, but also that the definition of the urban challenge to be addressed was not always easy for city departments themselves. Therefore, the leader of the SiR programme helped them to (re-)formulate challenges that were open enough to let room for startups to innovate, but also not too vague, and of such a scale and magnitude that it could be realistically expected that startups could deliver added value. After the first run of SiR in 2015, the programme became more known in the municipal organisation, and in rounds 2 (2016) and 3 (2017), the number of submitted challenges increased (see Table 1).

An example might clarify the process of involving a city department. A city project leader was approached by the SiR manager to know if he had a challenge that would perhaps fit in the programme. He realised that working with SiR could be a novel approach to tackle "his" problem of bike wrecks and wrongly parked bikes at the Rembrandtplein (a public square in the city centre) for which he was responsible. Normally the solution would be to have the bikes removed by a municipal maintenance team, but this was an opportunity to do it in a more friendly way. The project leader discussed participation in SiR with his team, in which all were enthusiastic, and they submitted a challenge. SiR told the team to formulate the challenge in a more open way, as the first draft was too specific. During the pitches, an Israeli startup presented an unexpected solution to develop an app for bikers, giving them offers (i.e. have a free drink in Starbucks) if they would do something positive (i.e. park their bike correctly). This example highlights that SiR stimulated the city departments, in the articulation stage, to reflect and clearly formulate their challenges. This was new to them and as such it gave an innovative impulse to the "buying organisations": it helped them to better understand what their real problem was, and to think about it in new ways.

Some of the challenges were not raised by city departments but by cross-departmental city programmes. One example is a city programme aiming to nudge tourists to spread more evenly over the entire city. This programme co-ordinates the actions of many departments under one single umbrella, but has no hierarchical power or procurement budget. This made it hard for the startup that worked for them to understand who their "client" actually was, and it proved unclear who would be the buyer of their proposed solution.

After the challenges were defined and published, the next step was to attract startups into the programme. Awareness campaigns were set up to make the programme known within the startup community. This effort can be considered successful; as shown in Table 1, on average,

there were 7 to 8 competing startups per challenge (and many others that applied for the programme). This indicates that startups became interested to participate in the programme, and saw value added in engaging with the city administration. First of all, many considered it as an attractive way to learn, and to further develop their company. Our interviews suggest that **startups tended to perceive SiR as an incubator programme**, and may have considered various other general incubation/accelerator options as well before joining SiR. Several startups described SiR as a relatively light type of incubator compared to well-known commercial, "pressure-cooking" programmes such as Rockstart. Unlike these, SiR takes no equity, deadlines and targets are softer, and progress was monitored in a somehow less rigid way. Overall, the programme was perceived as relatively flexible. The chances of being accepted are also higher: for the 2016 run of SiR, there were 90 applications for 10 spots (while this can be 700 for normal accelerators).

5. THE IN-RESIDENCE PERIOD

During the in-residence period, startups were supposed to co-develop a product, service or solution with their client. Along the way, for 5 months, they participated in a structured programme (on Wednesdays and Fridays) with mentoring, courses, pitches and peer review sessions.

Our interviewees agreed that the mentoring process is an important success factor. In the first run of the programme, mentoring was too fragmented: there were many mentors (about 30) with too little real commitment. For the 2nd run, it was decided to have fewer mentors (only 5) but more committed ones and also to pay them for their work. The mentoring focused on the business development of the startup, rather than on developing relations with the municipal "clients" (that was more the SiR staff's part), also because mentors are seasoned entrepreneurs themselves. The startups appreciated the mentoring overall, but with substantial variation: the more developed startups needed less of it, as they already had experience running businesses. Some more "senior" startups found the mentoring too general or not that needed; for the early stage startups, the mentoring was much more important.

The startups appreciated the rhythm of weekly courses and meetings. In their view, it creates a community (many of them still meet each other or join meetings of new SiR runs); courses and lectures were seen as useful, although not all of them (e.g. companies selling their product rather than really helping). Overall, interactive courses were seen as the best ones, where the startups could really discuss issues with an expert. Also the session on "how the government works" was highly appreciated. Moreover, interviews reveal that **the co-development process is a bumpy road, and different in each situation**. In fact, some startups already had a product and only needed to tweak it for the city challenge, while others developed their idea in a direction that they regretted afterwards – for some it took a long time to find a buyer after the in-residence period was over.

In the co-creation process, some funding (about 10k per startup) was made available to develop a prototype or solution. To access this funding, firms had to apply and defend what they needed and why – although the conditions to get this support were not always clear for the startups. Several firms indicated that this funding was crucial in the development of their solution, e.g. for placing sensors and antennas in the city´s infrastructure, or to develop new equipment in-house.

Our interviews suggest that for some startups in SiR, even though they were linked to a "client organisation", **it was not easy to understand for whom they actually developed the solution**. For a startup that developed a dashboard to track boats, it was very complicated to find out who is actually responsible for monitoring commercial ship traffic. Their "client" (water company) is charged by the City of Amsterdam for anything related to water in the canal area (pollution, maintenance, policing on the water); yet, the police must take care of policing on the dry side (quays), and outside the canal area there is still another division of work. On top of that, in 2017, the city government decided to hand over all policing tasks on and off the water to the municipality. Thus, it may be complicated for startups to understand who the client actually is,

namely when responsibilities are complex and may even change over time. Moreover, we learnt that confusion can easily arise as startups are not only accountable to their client but also to their mentor and the SiR programme management, each with sometimes alternating demands and expectations. Because of this, the interviewed startups stressed **the importance of having a project owner on the city side, identified early on**. For some, it took (too) long to find out who can really open the doors or is the right person within the organization/department. For example, one startup first had a contact person who always said that things were impossible, but finally "found the right guy who could arrange things with one phone call".

During the in-residence period, many actors have an influence on the further development of the start-up, the most important ones being the mentors and the assigning city department. Like with any other incubation programmes, **there is a risk that startups are drawn in a direction that with hindsight is not the best one**.

In some cases, the urban challenge fits well within the core business idea of the startup, but others changed their focus to meet the city demands. The most telling example is a startup in plastic recycling. With a self-built 3D printer, this early stage startup is able to transform dirty plastics into objects (such as plastic furniture etc.). They pitched for a challenge that was formulated as follows: "Develop something to raise awareness of the Amsterdam citizens to separate waste." By then, their founders were in a very early stage, and not sure what their actual value proposition was (reducing waste, producing plastic things, or something else). During the SiR period, they developed a proposition to offer workshops at schools where they would show to children how plastic can be reused (on top of that, they offered schools to buy some of their plastic furniture); the workshops became their core product. Looking backwards, the owners see it as a deviation of their main strengths and, after SiR, they re-focused on producing and selling furniture from used plastics. Also a mobility-related app developer startup had to bend their core product a bit; before SiR, they were already developing a tool to show tourists "of the beaten track" things in Amsterdam and their plan was not explicitly to spread tourism but just to give them a more authentic experience. Applying to the challenge of "spreading tourists", they developed their product more in that direction.

6. AFTER THE IN-RESIDENCE PERIOD

The tenets of the SiR programme assume that startups work to (co-)develop a product/solution during 6 months, and then will likely enter into a contractual relation with a city department that purchases their solution. However, practice was quite different. For the 2016 run of the programme, only in one out of seven cases it happened according to this scenario: the startup ended up selling a licence to the municipal water company that uses their dashboard software to track boats in real time. In the other cases analysed, there was no department buying the new product. For example, the plastic recycling-related startup involved stopped running workshops for schools (after it turned out that schools have no steady funding for this service) and now focuses on producing furniture for other private clients (e.g. to restaurants/bars willing to transform waste from drinks and bottle-related plastic into furniture, or developing art works out of plastic waste). Software developing startups are still struggling to develop their apps in a way that they can appeal to wider user bases. For example, one is still struggling to develop an app for alternative tourist routes; another has developed an app with data on urban waste collection, but would like to apply it also in other urban policy realms. Overall, there is no strong evidence of structured, continuing in-depth exchanges with the city departments.

On the one hand, this may be seen as a natural – and even positive – outcome of open-ended innovation processes, in which new experiments and solutions many times fail. In this case, the city and startup don´t need to carry on being locked in a sub-optimal or unfit solution any longer and may start looking for other new solutions. This is actually the rationale behind the recent EU procurement directive that underpins the legal construction of SiR (see Section 3.2). Yet, on the other hand, evidence for the interviews also suggest that the aforementioned ambitions of SiR may only work when other conditions are in place, namely **the involvement of a really committed buyer who really and urgently wants to have a problem solved**, and does not see it as something just experimental or a small “add-on” to already well-established solutions.

7. IMPACT OF THE PROGRAMME

Our aim was to analyse the impact of the SiR approach from two angles: the *economic development perspective*, i.e. does it promote startups and does it bring them new business opportunities, and a *governance perspective*, i.e. does it bridge the gap between the startups and the city bureaucracy; does it lead to a more innovative culture within city government.

All the startups interviewed gave a positive overall assessment of SiR. They see it as a good startup "niche" programme offering useful training and business mentoring. Concretely, SiR helped companies in a number of ways. The first and most mentioned benefit is the access to the right people in the municipality. The managers and mentors of the SiR programme open up their networks within the city administration and beyond – which would be very hard to identify and plug in for stand-alone startups; startups clearly state that having "SiR-stamp" makes it easier for them to enter into contact with municipal decision makers.

Second, SiR helps startups in their early-stage product development, enabling to set up trials and tests with citizens and/or other users. A case in point is a startup that develops an app through which citizens can notify the waste department when a container is full. The waste department gave them access to 100 people in an urban neighbourhood that were particularly committed to test new waste-related solutions, identified beforehand by the municipality ("waste bin ambassadors"). Another example is the one of the recycling startup, which benefited from seed funding from SiR to develop a specific machine (a special 3D printer) which, besides the prototyping stage with SiR, became important for their business overall.

Third, the SiR programme helps to turn public sector challenges (that otherwise would have been tackled in a traditional way by civil servants) into opportunities for startups. It makes it easier for city departments to engage in tenders to engage startups; if SiR would not have been there, many city departments would not have considered to enter a purchasing trajectory (too complex). Thus, to a certain extent, SiR creates a new market, albeit a small one.

Despite these positive aspects, the economic development impact should not be overrated, certainly not in the short-run. Most participating startups did not manage to secure substantial contracts; moreover, so far few startups are in a phase of scaling, in part because the solutions are highly specific to the city context. For the startups, as said, the main direct benefit of the programme has come through access to networks (to be eventually mobilised in the future), and increased understanding of how the local government works. In this sense, it should be interpreted as a training and incubation programme with a "smart city" flavour.

From the perspective of governance, SiR was intended to change the mindset of city departments and make them more open, agile and innovation-prone. As expected, our interviewees stress that cultural and language differences between startups and civil officers are important barriers for co-design and co-production of innovative solutions. The 5-month "in-residence" period was effective in addressing and raising awareness to these barriers, but naturally did not remove them to the full.

Some startups noted a shift in culture toward more risk acceptance and innovativeness within the department they worked with, but others did not. The city project leaders that we interviewed acknowledged that participation in SiR requires a deep cultural change in the municipal organisation. When working with startups, a higher degree of uncertainty must be accepted, city leaders must understand that participating in this involves risks and maybe failure. In the words of a project leader: "If I tell my boss that we develop an app to solve wrong bike parking, it is half the story. Because: it may fail. So I must tell him: it can go wrong." In this, case, it helps if a project leader could say that he was part of the SiR programme: then, people understand it's innovative and maybe a bit more risky. One of the city project leaders stressed the **SiR approach only makes sense for a certain bandwidth of problems and challenges: the ones that are not too simple but also not too complex**; also, it is often not about getting quick fixes because the programme involves a high degree of experimentation, both for developing the solution and for aligning interests/mindsets between startups and city clients. Because of this, the success of the SiR programme should perhaps not be seen on a per round basis, but rather as an accumulation of learning and experiences over a number of editions that may slowly trigger change in the way city departments look for innovations for their challenges.

After all, our analysis suggests that for a city department or programme, **buying from a startup is still fraught with difficulties**; it requires more patience and time from the buyer side, and also commitment. The startup that developed a 3D printer to reuse plastics illustrates the complexities. After hearing about the startup, a city programme ("Amsterdam Schoon", responsible for cleaning the city after events) became interested to buy bins made of reused plastic and could become an interesting launching customer. However, it would be difficult for the startup to produce bins on a large scale: it was not ready for mass production and the technology was not yet fully stable. After some rounds of talking, which gave the company hopes that they could get a big assignment, it turned out that Amsterdam Schoon would not buy from them, mainly because the product lacked certain specs (flat surfaces), and decided to purchase the bins from a large regular supplier.

Moreover, fragmentation on the side of the city administration is a big hurdle. An endemic problem in SiR is the lack of communication and alignment between city departments. One startup developed a solution for crowd management; they accidentally found out that another city department worked with another startup to develop a similar solution. This is not surprising given the fact that 7 or 8 aldermen are somehow involved in crowd management. On the one hand, if such an approach allows for more variety to emerge and new solutions to be tested, it also risks contributing to perpetuate silos and fragmentation in the local administration, and hampering the emergence of more significant contracts and bigger challenges for startups (e.g. if two departments would work together). In this way, some startups interviewed consider that putting their "eggs" in the local administration "basket" is too big a risk and soon start to invest more resources in looking for applications for bigger user markets.

As a policy innovation, SiR can be considered a success: several public institutions in the Netherlands were inspired by the results and process of SiR, and decided to take a similar initiative. The programme's website now includes three provinces (North Holland, South Holland, Gelderland), two cities (Utrecht and Den Haag), and two ministries (Defense, Justice and Security), although each institution is developing its own specific approach of involving startups in public procurement.

8. CONCLUSIONS AND OUTLOOK

In this paper, we described how SiR works, and gave an indication of its impacts so far. It provides new insight into the role and the relevance of new modes of innovative public procurement both for city departments and startups, and looked into how intermediaries (like SiR) are contributing to steer such a process. Currently, in a time when top-down, "smart city" solution-driven approaches by large corporate players are increasingly criticised, many hopes and expectations are placed on the role of startups to improve the functioning of cities, as they are believed to be more agile, open and innovative. From this perspective, SiR is an innovative effort to involve startups in the design and implementation of urban solutions and at the same time infuse the city administration with a more agile startup culture.

In this section, we draw conclusions and provide an outlook for further improvement of the SiR programme. In section 2 of this paper, we identified a set of conditions for innovative procurement programmes to be successful. Table 3 lists them again, and indicates to what extent these conditions have been met by the SiR programme. It shows that these conditions are met or at least partially met in the programme.

Table 3: SiR against conditions of innovative procurement

Success conditions for an IPP programme	Met by SiR?	Comment
It should have a mechanism in place to identify relevant challenges.	Yes	City departments are invited and nudged to submit challenges, and the SiR management helps to formulate them adequately.
The tender must be open enough to allow for innovation (few detailed specifications).	Yes	Tenders and challenges are formulated in an open way and allow for innovation.
It should reduce complexity and costs for startups to join public tenders (shall result in more startups participating).	Yes	The legal set-up of SiR enables startups to join complex European-level tenders in a very accessible way.
It should have a well-designed yet flexible co-creation process (will result in better solutions).	In part	The co-creation method is ad hoc rather than systematic, and depends on individuals.

It should offer scope for scaling beyond the one-off solution (for the startup, this will result in business development; and the city might replicate the solution in	In part	There is scope for scaling and the mentors in the SiR programme stress the business logic of scaling. Yet, as startups mainly work for one city department, there is no built-in mechanism to scale up within the city.
It should include incentives for a changing procurement behaviour from the buying organisation/departments (i.e. accepting more risks, putting effort in the co-creation process).	In Part	SiR invites city departments to procure from startups in a different way and accept more risk; however, participation is voluntary and based on individuals, and the scale at which it happens is still very limited. It is often seem as an experimental add-on detached from the "serious" procurement business.
An intermediary organisation is needed to guide this transition (from specs-based to IPP regimes) and co-ordinate the actions of the many players involved.	Yes	SiR plays this role, actively mediating and solving bottlenecks between startups and the municipality, also with the support of professional business mentors.

Overall, SiR can be considered very innovative from a process point of view: it is a new way of taking in fresh thinking and energy from startups into the municipal organisation. It has proved to deliver fast innovations in some well-defined domains where a relatively quick fix is possible and to (start to) infuse city departments with a more innovative mindset; and it has created business opportunities for startups (albeit to a very limited extent). Its legal setup is innovative and helps to give startups access to public tenders that would otherwise be very likely out of their reach. Importantly, the SiR programme indicates that the current legal framework is no fundamental barrier to prevent the inclusion of startups in public tenders.

It is questionable however whether the SiR-approach is suitable to tackle larger, more complex urban challenges such as air pollution, traffic congestion, complex urban planning issues, urban regeneration schemes, etc. Also in these domains, better and more innovative solutions are required, and a startup attitude could be beneficial. But in these types of challenges, the time frame extends well beyond the 6 months that firms have in SiR to develop a solution, and typically, these problems can only be solved as a collaborative venture of many public and private actors.

The SiR programme assumes a one-on-one situation (one challenge/client, to be addressed by one startup company). But in larger urban innovation processes, there is a many-to-many situation, requiring a co-production process in which many city departments and a variety of

private actors are involved. In this set-up, startups are only one element. A different type of intermediation is required to stimulate the engagement of startups in such processes.

In the current situation, SiR's double ambition – startup development and urban innovation – is squeezed in a 6-month pressure cooker, after which results are to be delivered. It is modelled after the market driven incubators that have proliferated. However, this model is at odds with the reality of innovation as a volatile and unpredictable process; history has shown that new ideas or solutions may come too early (the city or market is not ready for it) and get lost, only later to gain traction again. In this sense, SiR positively contributes to let many flowers bloom, but must be ready to recognise that many – if not most – of them will not be able to be absorbed by the city administration. In this sense, SiR works more as a business incubator with an urban flavour than something that can solve wicked city problems.

Rather than taking the startup company as central unit of attention, it could make sense to focus on larger challenges, consider the type of innovation co-creation process that could be helpful to address it, and then try to give startups a place in a bigger ecosystem. The current focus is too much individualistic, on stand-alone companies, and the fundamental difference between ownership (shareholders) and running the firms (actually doing things) is often conflated. This could be interpreted as a plea for a more ambitious programme than SiR, where one could identify large challenges, bring together a lot of stakeholders that are involved in it, including startups, scale-ups, incumbent suppliers, various city departments and develop solutions together. Yet, in this case, the types of incentives would need to be reconsidered, namely to attract larger companies and scale-ups into such an experimental process. For example, city suppliers could be invited to raise their challenges as well to be tackled in co-creation by startups, like city departments do now.

Clearly, the previous suggestions are much more demanding in terms of organization. Yet, a number of intermediary steps could be taken in order to both enhance the impact of SiR for startups and city departments while paving the ground for more (even more) ambitions programmes. First, "alumni" SiR participants could also become mentors of new startups in the programme – they understand needs and difficulties first hand; moreover, other mentors with more business-to-government experience could also become involved (vs. business-to-business and business-to-consumer). Second, a larger number of people within the city departments and administration could also get training (like the startups) on how to deal with innovation and procurement modes, ensuring more structured learning and the ability to interactive with innovative startups. Finally, there is considerable room to improve the alignment between SiR with other urban innovation programmes, such as the "Innovatielab" or the "Amsterdam Startup Programme", in which urban innovation issues are becoming also preeminent.

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CAN STARTUPS SOLVE URBAN PROBLEMS?

Can city administrations benefit from the entrepreneurial spirit of startups, and create better urban solutions with their help? In this paper, we critically assess the interplay between startups and city administrations for city-driven innovative public procurement or “challenge-based procurement” policy, taking Amsterdam’s Startup in Residence (SiR) programme as a case study. We describe and analyse this programme from two perspectives: i) the economic development perspective, i.e. does it promote startups and does it bring them new business opportunities, and ii) a governance perspective, i.e. does it bridge the gap between startups and the city bureaucracy; does it lead to a more innovative culture within city government.

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