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The making of a responsive city: The material (anti)politics of the Amsterdam Smart Light experiment

Dorien Zandbergen

Abstract

This article explores the material politics of what I refer to as the “responsive city.” This politics imbues urban objects that are made “smart” with responsive sensors, with the capacity to negotiate the multitude of interests that make up contemporary urban life in a frictionless way. The article attends closely at the unfolding of the Smart Light project undertaken by the Amsterdam Smart City network at the Hoekenrodeplein in Amsterdam Southeast. This project envisioned the “smartening up” of lampposts at this square by means of real-time sensors responding to local cues with different light settings. Bringing together many different interests, institutional cultures, temporal and spatial settings and technological standards, the Smart Light project negotiated different techno-political genealogies and, consequently, different ways in which smart urban objects come to matter politically. Being simultaneously invested with a progressive politics of local revitalization and with an entrepreneurial politics of global economic competition, the project integrated two different ways in which the smart lampposts were understood to be “responsive.” After detailing both these ways, I argue that the Smart Light project came with an overarching anti-political attitude. It created a context in which the discrepancies, frictions and tensions between both the political spheres in which the project unfolded, remained unaccountable to one another.

Keywords: smart cities, responsive cities, urban sensing, sensor-technologies, urban feedback, anti-politics, smart light, affect.

Introduction

In 2012, the *Amsterdam Innovation Motor* — a knowledge and innovation network that would later merge into the *Amsterdam Smart City* public-private network — spearheaded an experiment that was unique for the city at that time. Amsterdam was going to take the first steps as part of the multi-city program *Smart Lights in Metropolitan Areas*, which also involved the cities of Rotterdam and Eindhoven. As part of this experiment, lampposts at the Hoekenrodeplein, a square in Amsterdam Southeast, would be fitted with cameras, a public Wi-Fi network, and “adaptive lighting.” The project was seen as a “pilot,” that would eventually be implemented city-wide. As such, these “smart lampposts” were seen as a “stepping stone towards smart cities” (den Ouden et al. 2015).

As indicated in an early brochure of the project (Amsterdam Smart City 2013), the lampposts were expected to make the Hoekenrodeplein more energy-efficient, increase business opportunities and public safety, and foster civic participation simultaneously. As “stepping stones towards smart

cities,” the lampposts thus embodied the multifaceted promises that smart cities more generally are renown for (e.g. Gabrys 2014; Hollands 2008; Kitchin and Lauriault 2014; Luque-Ayala and Marvin 2015; Verebes 2013). In this article, I argue that these multifaceted promises depend on a particular material politics central to which is the coupling of two ways in which smart urban objects are understood to be “responsive.” In the first sense, the real-time sensor-based feedback processes enabled by urban objects made “smart” are celebrated for their capacity to leverage specific positive, transformational effects in local contexts. Second, the generic quality of urban sensors, i.e. the fact that urban objects can accommodate any and multiple types of sensors; and that sensors can produce data on multiple topics simultaneously, generalizes this transformational dream along multiple ideological, temporal and spatial axes.

Taken together, the material affordances of urban objects made “smart” by means of real-time sensors maps onto and feeds into the dream of *responsive cities* accommodating and reconciling multiple, divergent interests simultaneously: local positive transformations are coexistent with those on a global scale; corporate profit coexists with environmental gain; and dreams of civic empowerment go well together with the competitive quest of municipalities to establish themselves globally as smart city forerunners. A key characteristic of the politics of the responsive city moreover, is the relatively large investment in the idea that political transformation will be leveraged by responsive urban objects, believed to be uniquely endowed with the capacity to negotiate multiple interests in a frictionless way. As I argue in this article, this politics then requires and instigates spaces of negotiation that are shielded from the messy, frictionfull, slow and complex spheres of everyday political deliberation.

In focusing on the material politics of the making of a responsive city, the argument in this paper differs from recent critical scholarship in which the smart city features as the epitomic example of the ways in which cities have given in to neoliberalization and a concomitant erosion of democratic principles (i.e. Greenfield 2013; Halpern et al. 2015). This work has gone hand in hand with another strand of critical scholarship and public debate that foregrounds the democratizing potential of responsive digital technologies if deployed in bottom-up ways (Amin 2013; Kresin 2013). Rather than a priori adopting either of these perspectives, I argue that what is particularly interesting about urban sites becoming “smart,” is the extent to which this requires the negotiation of different techno-political genealogies and, consequently, different ways in which smart urban objects come to matter politically.

As we will see, the Smart Light project is both a progressive project envisioning positive socio-economic transformation; and an anti-political experiment that shields itself off from local contested politics and messy material frictions while investing in the always distant dream of future potential innovation. In this article, by attending closely to the development of the Smart Light project, I seek to understand how both these political attitudes combine in producing different and divergent understandings of the materiality of smart lampposts. As the lampposts at the Hoekenrodeplein turned from average poles into *smart* poles, what was required for these poles to be both responsive to the local demands of a specific urban site and to generic interests in an always “proximate future” (Bell and Dourish 2007)?ⁱ

In the following I set the stage for this exploration by means of a brief sketch outlining how urban objects –and not in the first place the practice of public debate and deliberation– have come to be imbued with the capacity to affect and leverage urban political processes.

The sensorial politics of responsive urbanism

From Manuel Castells’ *Informational City* (1989), to Michael Batty’s *Computable City* (1997) and Nigel Thrift’s *Sentient City* (2014), many different metaphors and imaginaries have been proposed in the past decades to grasp and theorize the growing convergence of urban environments and digital infrastructures.ⁱⁱ One metaphor that has for decades indicated the political connotations of this coming together of digital affordances with the urban is the figure of the “network.” One of the relevant contexts in which this notion emerged was in the 1990s as “smart urbanist” movements in the US attempted to increase environmental sustainability, security and economic and social wellbeing in new organizational constellations such as trans-sectoral and inter-regional public-private arrangements (Hajer et al. 2014; Dierwechter 2013; Herrschell 2013). During this period, the network, Andrew Barry writes (2001), became the marker of “a ‘new’ politics,” indicating “a break with what are regarded as the old centralized models of commercial and political organization and older collective models of society and class” (85). As a “metaphor and a model of collective and individual life,” the network drew together different objects, agents and very diverse political orientations. It became, for instance, associated with “new forms of entrepreneurial activity and freedom,” and a model for “the intricacy of relations developing between different political actors in the context of new forms of national and transnational governance” (Barry 2001: 85-87).

Whereas the figure of the network is still prominent today, the rise of the Internet of Things (IoT) and sensor-based infrastructures has fed into a range of other imaginaries that describe digital

infrastructures in more material and affective terms, focusing not only on their morphological structures, but also on how they interweave with and operate upon (urban) environments. IoT creates a situation, in the words of Mark Shepard (2011), in which the internet is “leaving the desktop and spills out onto the sidewalks, streets and public spaces of the city” (Shepard in Schipper 2011: 7). With everyday objects, such as lampposts, park benches, cars and clothes becoming responsive to cues in the urban environment, objects, feelings, thoughts, ideas, people and institutions might be imagined as part of one “sentient” (Thrift 2014) sensorial environment, or “sensorium” (Jones and Arning 2006). Sensor-technologies are as such imagined to directly affect the material fabric of the urban, by rendering the digital more material and the urban more malleable. New forms of data visualization, machine-to-machine interrelations, collective automation and the expansion of sensor technologies, Nigel Thrift writes, transform cities into “continually unfolding, fluid and convective maps.” Referring to face-recognition sensors that provide personalized sales-propositions on public billboards, Thrift describes how sensors “actively shape the environment,” making the city “more plastic and malleable” turning data and information processing into “one of many materials from which objects can be made” (Thrift 2014: 9-12).

For Thrift it is an open question whether the described “sentience” is “occasioned by the existing lines of corporate and state power manifested in the security–entertainment complex,” (ibid.: 15) or whether they are tied into “an ethic of care” and “make things more interesting and less predictable” (ibid.: 18). Orit Halpern et al. zoom in on the former possibility, depicting the ways in which sensorial urbanism offers unprecedented opportunities for global capitalism in the ability to “operate through networked nerves that hook the sentiments, feelings, and movements of live bodies into larger circuits of capital and technology” (Halpern et al. 2015: 291). This politics can be imagined as “depoliticizing,” as it “operates at a level far beneath consciousness” (ibid.: 291), providing no easy context in which differences and opposing perspectives can be articulated in a meaningful, consequential way.

Yet other commentators and practitioners recognize great transformative and democratic potential in the responsivity of urban sites. For Ash Amin (2013) for instance, the notion of urban sensorial environments does full justice to the actual “animated” character of urban life and counteracts impulses to domesticize and control this lifelines in top-down centralized ways. As such, this image is a welcome antidote to long-standing simplistic notions regarding the ways in which urban sites transform a person into “deliberative citizen, collective actor, and political claimant” (Amin 2013: 240, 241). This “received wisdom on the sociality and the politics of (urban) public space” which

posits a simplistic relation between public spaces and civic political attitudes, according to Amin, does not account for the ways in which urban spaces are “animated,” i.e. characterized by a changing and intense sociality, which is tied to “the choreography of bodies and to the atmosphere of place” (ibid.: 240).

Whereas Amin’s analysis of the urban as “animated space” does not center on the digital, digital infrastructures play a role in his proposal for alternative modes of city-making and engineering that do justice to these affective dimensions of the urban. Amin refers to “sensors [and] interactive artworks” which embed “intelligence and agency” across the skin of the city, enabling a thinking of the “city as a sensorium.” This sensorium can “open new possibilities for action, [solidarity and care] in the backfill of the deliberative” (ibid.: 255).

In the past years, a multitude of actors operating at the crossroads of academia, art, design and political activism invested in the affordances of digital infrastructures to amplify the capacities of urban environments to be responsive to the spontaneous interventions of citizens. The London architect and artist Usman Haque, for instance, designed interactive citizen engagement projects such as the Open Burble (Umbrellium 2017a), or WearAQ (Umbrellium 2017b), in which networking technologies are used to “encourage citizen enfranchisement and creative diversity rather than disengagement and homogeneity” (Umbrellium 2017c). Haque’s responsive urban infrastructures and artworks seek to emphasize the “serendipitous connections” in urban sites rather than encouraging the “one-size fits all, top-down strategic approach to sustainability, citizen well-being and economic development” that he associates with corporate-led smart city projects. A crucial element in his approach is collaborative design, or “co-creation”, the practice of involving “citizens directly in the design, prototyping and rollout of urban propositions so they have a vested interest in outcomes” (Haque 2012).

Also de Lange and de Waal (2013) emphasize how smart civic infrastructures may help people “engage with communally shared issues,” envision themselves “as part of the urban fabric, and understand that their individual actions make a difference to the common good” (no page). One of the examples cited by the authors is Christian Nold’s Biomapping project (Nold 2004). This installation collects biometric data from citizens while they walk across town. Visualizations of this data are then used to facilitate conversations about urban space. Another example is the Urban Tapestries project, which enables people to “build relationships between places and to associate stories, information, pictures, sounds and videos with them” (Urban Tapestries 2009: p). Such

projects are presented as examples of how researchers, artists and activists, use “distributed sense-making. . . for advocacy, art, play, and politics” (Cuff et al. 2008: 29).

The recent figure of the “smart citizen” has further developed this thinking and tinkering approach to affirm a distance between “messy, decentralized, and democratic” technological practices from “clean, computed, centrally managed order” (Townsend 2013: 9) imposed by “top-down” smart city proposals. The “smart citizen” — a notion evoked interchangeably with other denominators such as “citizen scientist”, “civic hacker” (Townsend 2013), “illuminated citizen” (Kresin 2013; van Timmeren & Henriquez 2015) or “hacktivist” (Hampson 2012) — uses Do-It-Yourself (DIY) small-scale improvisational technologies and infrastructures as a way of coming to terms with an urban reality that is “chaotic and unruly” (Greenfield 2013).

In such celebrations of responsive urban environments and tinkering-citizens fully at home in them, scholars, artists and architects seek to do away with the rigid and limiting forms of urban development and imagining that they locate in the “received wisdom” of planners and political scientists, in the conventional innovation practices of established corporations and in the “top-down” infrastructural designs of corporate smart city projects. Instead, they propose an approach that emphasizes locality, serendipity, community and horizontal collaboration.

Yet, as several scholars have argued, there are “similarities in the smart technologies, techniques and rationalities underpinning both dominant and alternative approaches” to smart city making (Luque-Ayalaa and Marvin 2015: 2113; see also Gabrys 2014: 42). Indeed, as I show in the following, the tropes of bottom-up empowerment and the vision of decentralized urban governance and civic inclusion also inform the rhetoric and development approaches of the Amsterdam Smart City Smart Light project. Yet, these manifestations of progressive politics materialize in a context where they are tied in with national and transnational agendas pertaining to the goals of urban branding, knowledge-production and corporate innovation. How, I ask in the following, does the project’s dedication to open up a local urban site to more engaged public involvement, negotiate its simultaneous manifestation as an experiment for academic learning, corporate business development and municipal international competition? In the following, I approach this question by first sketching the material affordances of the smart lampposts to affect the local context of Hoekenrodeplein.

Smart lampposts for local revitalization

Hoekenrodeplein is situated at the intersection of two parts of Amsterdam Southeast with very different histories and profiles. At the West end of the square is the “Amsterdam Poort [Gate]”, a

shopping and office area that leads to the multi-ethnic Bijlmermeer neighborhood. The Bijlmermeer, colloquially referred to as “the Bijlmer,” was built in the late 1960s based on typical modernist planning ideology, with high-rise living quarters and car traffic separated from pedestrian areas. However, attracting a predominantly immigrant population who were given little access to employment, the local population struggled with socio-economic problems such as “debt, crime, drug abuse and the deterioration of the neighborhood” (Dukes 2016: 379). Demolition of the high-rises and large renovation and social projects took off in the early 1990s, and crime and unemployment and poverty rates reduced. Yet, to this day, the “Bijlmer” still suffers a bad reputation. To the east, beyond the underpass of the railway station that borders the square, the Hoekenrodeplein gives access to the more recently built Arena Boulevard. Here, a pedestrian promenade leads to a range of high-profile locations such as the Arena soccer stadium (home of Ajax), concert halls, cinemas, malls, entertainment complexes and offices. This area draws visitors from far beyond the local neighborhood, from international business cohorts to regional sports and music fans.

In 2012, as the Hoekenrodeplein was in need of renovation, local government actors decided that it would have to do a better job in connecting the still stigmatized and underprivileged Bijlmer quarter with the more affluent and prestigious Arena area. As the “area manager” for the local municipality explained to me, the renovation plans sought to turn the square into an attractive space that could lure visitors from the Arena Boulevard further into the Amsterdam Poort. Instead of taking the train or car straight back home after work or entertainment at the Boulevard, a newly renovated square would entice visitors to stay and discover the joys of local cuisine and shopping.

Around the same time, the Amsterdam municipal government’s Department of Economic Affairs initiated their *Smart Lights in Metropolitan Areas* program. In a joint letter sent to the national government, the then Amsterdam councilor of Economic Affairs, together with those of the cities of Eindhoven and Rotterdam, announced a collaborative effort to “strengthen their competitive stronghold,” through joint investment in “intelligent and sustainable public lighting,” “roll-out of smart city agendas,” and international profiling regarding “smart solutions,” amongst other measures.ⁱⁱⁱ Because of Hoekenrodeplein’s vicinity to an internationally prestigious area, combined with the fact it was already up for renovation, the Amsterdam councilor recognized the square to be an opportunity for the city to take the lead in this endeavor and to begin a local pilot straight away.

Amsterdam's CTO, then program manager of the Amsterdam Innovation Motor, became project lead and asked an employee who worked for the municipal lighting infrastructure division (DIVV) to manage the municipal side of the collaboration. The latter's task was, as he put it, "to make sure the project wouldn't get caught up in municipal legal and organizational complexities." The CTO himself would take care of the "external relations," with Cisco, Philips, the energy network company Alliander and the Technical University of Eindhoven all part of the initial "steering team." The DIVV partner added to this steering team representatives of several municipal departments and divisions, both from the central city and the local Southeast municipality.

Four years later, on a sunny afternoon in February 2016, some members of this steering group gathered around a lamppost on the Hoekenrodeplein. As they looked up at a lamppost, the soon-to-be Chief Technology Officer (CTO) of the city of Amsterdam pressed a button on his smartphone. Yet, because it was daytime, it was hard to see whether the light responded to the app. Nevertheless, it was time to make a toast, to indicate the completion of the Smart Light project.

At a workshop on smart cities a few months earlier, the Smart Light project lead responded enthusiastically to the suggestion of the discussant that the smart light infrastructure was "like a DJ that feels the vibe of the room." This is indeed how, early on in the project, the "use cases" for the Smart Light project on the Hoekenrodeplein were envisioned (Amsterdam Smart City 2013). Presence-sensing cameras attached to light poles would respond to the amount of people on the square, the ambiance and the occasion with the appropriate light intensity, color and rhythm. One of the project initiators' dreams, at the start of the project, was that this sensing would occur in real-time, and that the algorithm controlling the lights would be "self-learning." It would gradually learn the social and seasonal rhythms of the square, understand the effects of its light scenarios on the number of people on the square and adjust its scenarios accordingly. In this way, for instance, the lights could respond to the Amsterdam soccer club losing a match in the neighboring stadium with "pacifying" colors. An additional idea was that at nighttime the lights would dim by 50 percent but would temporarily light up to illuminate the pathway of the occasional visitor.

If the lampposts would, as such, operate as a DJ that is responsive to the "vibe of the room," it would be a DJ that one could get into conversation with: the responsivity of the lampposts would be a two-way affair as people on the square could also control the lights and settings of the posts more directly. For instances, users of the square could book a moment in the spotlight on the "virtual stage," as dedicated spot lights and video cameras could "broadcast the footage to a display

area” (Amsterdam Smart City 2013). People could also request a “virtual sports field” to be projected onto the floor to facilitate different kinds of games. For the chief strategic director of the energy network company Alliander, a partner in the Smart Light project, the interactive affordances of the lamppost would hold great democratic potential. As she put it: “This project is about creating a new paradigm. It will open up space in entirely new ways.” In her vision, by imbuing pedestrians with the capacity to make ad-hoc, real-time decisions about the lights, the smart lampposts anticipate a future-smart society that will be governed by “minute-to-minute democracy.”

This vision of democracy and civic participation also informed the intended multi-stakeholder approach to the project’s development and implementation plans. The smart infrastructures would be open to programmers and developers to build and implement their own services and projects. This was facilitated by plans to install free public Wi-Fi onto the network and to solicit commitment from the corporate partners to open up their protocols for third-party usage. Another way in which the project was anticipated to be open to involvement from a larger public was by organizing an informative evening to share ideas and invite responses to the Smart Light project.

It took some time though before the local municipality was convinced of the transformational potential of these smart lampposts. The area manager, who joined the team as a representative of the Southeast municipality, recalls being somewhat skeptical of the project at first:

I had doubts regarding the choice for the Hoekenrodeplein as a pilot location. I think it would have been much better had the lights been installed in the residential area and the small shopping centers beyond de Poort. Here it would directly benefit the local inhabitants and entrepreneurs.

By choosing the Hoekenrodeplein, she feared, “the money would benefit the already affluent.”

Yet, along the way, this municipal representative developed more enthusiasm, particularly when she saw the plans for the smart light “use cases.” These matched quite well with the previously existing renovation plans. According to these plans, the renovated square would have to radiate “safety and coziness” for instance by facilitating the organization of small events and performances. The virtual stage and soccer fields in the Smart Light plans would accommodate these functions, as would the “adaptive lighting.” Furthermore, the Smart Light project envisioned that the lampposts’ smart functions would be extended from the square into parts of the Poort. It could well be, the municipal representative reasoned, that this plan would do a good job in connecting the West and East sides of the square in ways that conventional lampposts could not.

In this vision of local revitalization, the capacities of the smart lampposts to be responsive to the local environment were thus celebrated for their anticipated progressive political effect.

Whereas conventional lighting could create a cozy ambiance on the square, the “smart” features would have the additional political potential to engender socio-economic upward mobilization in more proactive ways. The smartphone-app, for instance, would give a previously disadvantaged population and their political representatives control and access to infrastructures that are connected to a futuristic world of global technology and power. Also, as the self-learning sensor-network would respond to all bodies on the square – no matter their socio-economic, ethnic or cultural backgrounds– they were expected to contribute to a more diversified use of the area. As such, the area manager became quite attached to the vision of the Hoekenrodeplein turning “smart.”

The end of the Smart Light project?

Yet, after an initial phase of project meetings in early 2013, a long period with sparse information and contact followed. Renovations to the square had begun: the square was opened up to place the required cables and to insert the new lampposts, yet without the elements that would make them “smart.” Then, in early 2016, a colleague at the municipal office informed the area manager during a happenstance encounter that the square was to be officially opened. She was stunned, as she told me: “We were totally not ready yet. Nothing of those nice things that were promised had been realized. How would they then be able to *launch* it?”

The official launch was a surprise and slight embarrassment to other project participants as well. It had become clear to everyone that the project had not lived up to the promises laid out in the initial vision and in the ambitious proposals announced in the letter to the cabinet. As the area manager recalls: “The idea was that the square would realize something that was highly innovative and that had not been realized elsewhere.” Yet, all that was realized, a researcher from the Eindhoven university told me, is a “light system that is preprogrammed with eight standard scenario settings. We were already able to do this when we started in 2013.”

The accounts of what happened, as well as what *did* and what did *not* get realized and finalized differ amongst the participants. My interviewees pointed to a combination of technical, organizational and financial issues. The main problem, according to the TU Eindhoven researcher, was that “the infrastructure consisted of so many complex and disparate elements, but there was no-one assuming responsibility for the integration of it all.” The DIVV project leader points to financial misunderstandings. “The understanding was,” he told me, “that everyone would

contribute their part: the municipality would offer the square and take care of the procedures, and the tech companies would invest with equipment.” This is also how the Southeast area manager understood it. Yet, towards the end of the project, “these companies wanted *us* to pay for their equipment, this is not what we agreed on,” she says. The TU Eindhoven researcher points out that in her opinion the municipality should have been more forthcoming: “Municipalities tend to think that way: they offer up a public space and expect all the investment to come from private partners, but this is not feasible for them.”

There were also disagreements amongst corporate partners regarding the best way to organize presence-sensing. In the original plan, presence-sensing was going to be taken care of by cameras attached at the far top of the lampposts. In this way, only four cameras could cover the entire square. Without realizing the implications this would have for the Smart Light project, the square designers decided however that, for aesthetic reasons, the cameras had to be attached on the lampposts’ extended arms. At this height, the cameras had too narrow a range of vision for full coverage. Cisco proposed to solve this by sensing people’s presence in *indirect* ways, i.e. by means of the MAC addresses^{iv} of people’s mobile devices, which could be captured through public Wi-Fi. For the TU Eindhoven researcher, this solution would severely limit her possibilities of doing the research she had planned. Her plan was to use the information generated by presence-sensing cameras to correlate particular light settings with fluctuations in the numbers of visitors. MAC address capturing would give a much less accurate picture, and would furthermore, she told me, raise important questions regarding ethics and privacy. Philips objected to the use of Wi-Fi-sensing for different reasons: the presence of trees on the square would render this form of sensing “unstable.” Instead, the company proposed their self-developed Remote Frequency technology. As the different institutions and companies proposed solutions that were most beneficial to their interests, no final agreement was reached and presence-sensing fell of the table as a feature of the project.

Another reason for the difficulties faced by the project had to do with ongoing shifts in the composition of the steering team. Along the way, certain leading organizations and individuals became distracted by other career and market developments. In March 2014, the workload of the project lead increased as he became the city’s sole Chief Technology Officer. In May of the same year, the Amsterdam councilor of Economic Affairs left her position, and in September 2014 Philips let go of its light division to focus more strongly on “Healthcare” and “Consumer Lifestyle.” “The project lost most of its champions,” the TU Eindhoven researcher summarizes these shifts.

Simultaneously, new partners were added to the project to solve some unanticipated problems. In the original plan, for instance, the lampposts would offer free Wi-Fi, made available by the municipality. Yet, the partners found out in later stages that the municipality was not allowed to do so: the Dutch government had just put up the 4G frequencies for auction and Wi-Fi exploitation could only occur by private partners. As a result, the Dutch telecommunications company KPN joined the project, bringing its own financial conditions, for which no budget plans existed.

Another aspect of the plan that stranded had to do with the ambition to involve local entrepreneurs into the project, so that they could become the “owners” of the infrastructure. Yet, two necessary requirements for this involvement ended up lacking: in the first place, in addition to the public Wi-Fi not being implemented, the protocols used for the light scenario were not “open” in the way anticipated by the municipality. Whereas the municipality envisioned these infrastructures to be fully accessible and modifiable for third-party users, “open” for the corporate partners merely meant that the infrastructures could be *used*, perhaps by paying a fee or getting a subscription.

Secondly, the project’s language, vision and stated aims proved difficult to reconcile with the more immediate interests of local businesses adjacent to the square. In December 2013 the local municipality, together with the project leads from the central Amsterdam government, organized a meeting for local entrepreneurs. After presenting the plans for the square, owners and employees of the shops, restaurants, cafes and hotels around the square took the opportunity to ask questions that were, one of the conveners told me “entirely unrelated to what we had just explained regarding the Smart Light project.” They asked about sign-posts, unloading and loading places and accessibility for pedestrians during the renovation activities. Other questions were more generically about the division and maintenance of the square after its completion. Some asked about the amount of space they could use for terraces, others about the location of sunshades, yet again others about the anti-slippery policies in winter, garbage collection, and the lighting of dark corners of the square.^v

In sum, due to constant shifting compositions of the team; technical incompatibilities; fragmented behind-the-scenes negotiations; financial disagreements; a mismatch between the interests of local entrepreneurs and project initiators; and the absence of one clear locus of control, the project ended in an impasse. Members of the initial steering team slowly became alienated from the project and communication petered out. “It died a slow death,” the TU researcher concludes. In the start phase in 2013, the DIVV project manager recalls, the project meetings had been conducted in a

spirit of possibility, mutual trust and collective action, giving “a lot of energy.” “There were so many dreams, but when push came to shove, certain things proved impossible.” As also the TU Eindhoven researcher told me, the later phases of the project consisted of a lot of “pulling and dragging.”

Yet, while the lampposts failed to be smart in physical and technological sense, they offered an additional way in which the project could be celebrated as a success. As I discuss in the following, this required a celebration of the smart lampposts as generic devices, transcending as such the particularities and complexities of the local setting of the square.

The generic smart lamppost

Looking at the Smart Light project from an ethnographer’s perspective, one of the things that stands out is the huge political challenge the project set itself up for: it brought together many different interests, institutional cultures, temporal and spatial settings and technological standards that were, so it seems, bound to come into collision with one another. In their under-managed ways, these collisions led to the project’s inability to realize the envisioned smart infrastructures, which must have severely burdened the large network of people and institutions who dedicated so much time and financial resources to its realization.

Yet, whereas several project participants did express frustration regarding their failed and aborted efforts, another narrative ran through the project. From the perspective of this other narrative, the Smart Light project is not itself a manifestation of sociotechnical complexity, but is instead part of an arsenal of “smart solutions” responding innovatively to the complex challenges of contemporary urban life. According to the aforementioned strategic director of project partner Alliander, for instance, the fast-changing complexity of everyday urban life can’t be effectively governed by means of “19th century ways of thinking.” Instead of depending on the slow procedures of a-priori consensus building, she said during the smart city workshop mentioned earlier, fast-changing urban settings require the ad hoc mediation of real-time responsive technologies.

Central to this emphasis on “minute-to-minute governance” is the notion that urban objects need to be as flexible as possible to accommodate the constantly shifting needs, demands and requirements of urban life. This flexibility is also built into the framing of the Hoekenrodeplein: in the Smart Light project proposal, the square is explicitly framed as a place with constantly shifting needs. Depending on the mood of the visitors, the weather, the result of football matches, the rhythms of the seasons or special events planned, the lampposts ought to respond in ways that

suit the particular context and setting. In the visions for smart cities more generally, this urban dynamism is reflected and accommodated by responsive infrastructures. Whether tending to traffic flows, energy pricing, public transport provision or water regulation, smart cities envision the creation of infrastructures that can constantly adapt to shifting environmental demands (Hajer et al. 2014; Roche 2014; Verebes 2013).

This adds another layer to the envisioned role of smart urban objects in the context of responsive cities: their responsiveness does not only reside in their material affordances to respond to cues in the urban environment by means of sensor-controlled feedback mechanisms. It also resides in their envisioned multiplicity: smart urban objects are not mere singular objects with fixed properties. Instead, they are generic devices that can adopt many functionalities. From this perspective, that which qualifies the lampposts at the Hoekenrodeplein to be “smart” is not only their technological capacity to project a game onto the floor or to respond to calamities with bright white lights; but also to perform themselves as police guard, conversation partner, DJ, air quality monitor, traffic regulator and, not to forget, lamppost, simultaneously. The TU Delft researcher describes this way of looking at the smart lampposts as requiring a “fundamental mind shift,” by focusing not in the first place on “products,” but on a “new ecosystem” in which “there are no blueprints for the desired solutions and it is impossible to write clear specifications for the desired solution” (den Ouden et al. 2015: 91, 92). In this way, the smart lampposts also acquire a futuristic quality. In addition to their material manifestation in the singular circumstance of the present, they embody the multiple potential circumstances of possible futures, opening them up to “continuous innovation” (den Ouden 2015: 84, 85). The Cisco “Internet of Everything director” framed the lampposts in a similar generic way by referring to them as “the iPhone of the street”:

These lampposts bring together the affordances of broadband and electricity. Many other things can also be attached to it, such as sensors and cameras. Lampposts thus become a central node in cities by gathering endless amounts of functionalities. If you invest in public light in a smart way, you thus not only take care of public lighting, but you create a network and a platform for many more and other services.

This notion of the network and platform is, from the perspective of the IoT director, more essential to the lampposts’ operationality than the actual sensors attached to them:

It doesn’t matter what you hang in these posts: they can be air quality sensors, Wi-Fi routers, sensors to count traffic, or to keep track of smartphones. It doesn’t matter, you can just choose what you want. These lampposts are becoming like the iPhone of the street.

Just as an iPhone can be imagined as a malleable object with limitless functions, so does the smart lamppost dissolve the distinction between object and network, between material actuality and future potentiality.

Another way in which the Smart Light project foregrounded the generic quality of the smart lampposts was in its specific framing of the way in which the lampposts produce “value.” Rather than producing one specific type of value for one specific previously defined group, their contribution was cast in terms of their “total value.” The evaluation report of the project refers to the project’s “total value” as its ability to combine many different perspectives (“economic, ecological, sociological, psychological and more”) and forms of valuation for each of the partners (den Ouden and Valkenburg 2014: 2-6).

The “generic value” of the Smart Light project was also affirmed in the way that the narrative of “learning” linked the specific site of the local Hoekenrodeplein to temporal and spatial settings beyond the square. As the Amsterdam CTO told me, the technological, cultural and institutional frictions produced by the project were significant for the ways they produced learnings for the Amsterdam Smart City network. They had taught the network, for instance, that it is very hard to get multiple multinational companies, with very different cultures and philosophies, to agree and collaborate within one project. The network had also learned that the notion of “open infrastructures” meant different things to different partners involved. One of the things they’ll do differently in subsequent projects, according to the CTO, is that “we are going to build these infrastructures ourselves so that they can be truly open, in the way we intend them to be.” Another learning regarded the question how civic and local involvement should be organized. “One should involve these partners even earlier in the process, and we should make use of existing participation tools such as local platforms.” “Even though the project seems a failure,” the CTO concludes:

... we learned a great deal from it, which will enable us to be more successful in new and other projects. This particular project did not benefit the local area, I admit, and I am sorry about that. But in an indirect way it paves the way for better projects in the future, projects that *will* benefit the local community.

The political materiality of smart lampposts

The celebration of the Smart Light project in generic terms – producing a “total value” for all participants, and remaining open to future innovations – did, in turn, produce value for some of the partners involved. After its public “launch,” the project featured as a showcase to the capacity of the Amsterdam Smart City network to facilitate innovative, beneficial collaborations between public and private partners. At the day of the launch, in an online report published on the

Amsterdam Smart City website, the EVP New Business and Smart Cities KPN congratulates the city of Amsterdam and the Southeast municipality with the launch of the “Smart Light IoT network on the Hoekenrodeplein.” According to the author, “this milestone testifies to the fact that co-creation within the Amsterdam Smart City ecosystem works, and can offer real solutions to metropolitan issues.”^{vi} In similar ways, the project has been reported on and advertised as a manifestation of the involved institutions and corporations to propose innovative solutions to complex urban problems.^{vii}

These online reports don’t mention the frictions, incompatibilities, and disinterest from local partners. As such, they are indicative of the way in which the celebration of the project’s generic value required the expulsion of actual bodies, objects and their mutual frictions. Unwittingly then, the suggestion of the Cisco CTO that smart lampposts are like iPhones, is revealing of the project’s anti-politics. At first sight, the metaphor suggests smart lampposts, like iPhones, to be directly responsive to the preferences of their users. This metaphor suggests, furthermore, a radically progressive politics, conjuring the image of an urban environment opening itself up to “minute-to-minute voting.” However, as is the case for platform-connected digital devices more generally, individual decisions pertaining to the use of digital devices are conditioned by the profit models, institutional strategies, global dynamics, and ideological framings of platform owners (e.g. van Dijk et al. 2016). As the lamppost sensors pertain to be immediately responsive to cues given on the local square, the actual decision-making processes that define how, when and where these infrastructures are implemented and how they generate value, occur in a parallel world disjointed from the local setting of the square.

To illustrate, let’s return to the experiences of the area manager of Amsterdam Southeast. In 2015, after a long period of non-communication with the other project partners, she received an email from the recently added project lead from partner KPN, someone she had never met or heard of. He invited her to a meeting in the Arena Innovation Center at the Arena Boulevard. “It is only a couple of hundred meters away from my municipal office,” she recalls, “but it literally felt as if I was crossing over into a different world. A world where I didn’t know how to read the signs.” The building that hosted the meeting contributed to this sense of loss of orientation. It had no signs or reception desk and it was unclear to her which door to enter. She arrived late at the meeting, to find that she “didn’t know anybody there.” People in suits spoke a language she barely understood, using jargon she had not heard before. “These were fancy terms, relating to innovation and technology,” she says. “There were a lot of top officials, but I didn’t understand anymore what the links were between everyone, and what my role was in the whole.”

In an attempt to trace the connections back to where her own responsibility for the square was meant to reside, the area manager asked what had happened to those features of the project plan that served her interest and would be placed under control of her department. These were the virtual stage and soccer field, as they would improve the square's ambiance and increase its attractiveness; the extension of the smart posts further into the Poort as this would strengthen the connection between East and West; and the app that would be built for the square maintenance and management department so that they could manually switch between scenarios. "I asked at the meeting what happened to those features," she remembers, "yet I was told that the stage and soccer field would not be realized."

Final decisions in this regard were made at a different meeting: the CTO called a final meeting with the municipality, KPN, Cisco, Philips and Alliander where it was decided that any further attempts to rescue the project, install public Wi-Fi, develop the app and open up the infrastructures, would simply be too costly and irresponsible. "Everyone there had somehow obtained learnings that were relevant to them. For the project, the urgency and momentum was gone, it was time to pull the plug."

Conclusion

Shaped in the context of various overlapping techno-political legacies –from urban entrepreneurialism (Harvey 1989) to the irreverent politics of DIY tinkering (Levy 1984)^{viii} – contemporary visions of urban digitization come with a "fantasy" of "the transformation in the management of life — human and machine" (Halpern et al. 2015: 278). At the heart of this fantasy is the central role played by responsive urban objects, imbued with the capacity to transform the multitude of frictions that are part and parcel of everyday urban life, into frictionless and seamless flows.

In this article I sought to explore the material politics of this "fantasy" of urban responsiveness by looking at one particular case, the Smart Light project undertaken by the Amsterdam Smart City network at the Hoekenrodeplein in Amsterdam Southeast. What did it mean in material-political sense that the lampposts on this square were made responsive? How did the dream of responsive seamlessness relate to the material affordances of these posts, both as they were imagined in the context of the project and in the ways in which they designed and implemented?

I explored this question by looking at two ways in which the smart lampposts were imagined to be responsive. In the first meaning of the term, the responsiveness of the lampposts was expressive of a progressive politics, actualized in the local setting of the Amsterdam Southeast

area by means of the material affordances of real-time sensors. In this sense, the capacity of the lampposts to seamlessly link people's bodies and intentions to light-settings and scenarios by means of real-time sensors, translated into their imagined political capacity to lift the Amsterdam Southeast area up from its underprivileged past. This politically progressive interpretation of the lampposts' responsiveness was married to a second one. In this sense, the lampposts were made to respond to a global speculative economic sphere, bringing with them the futuristic politics of what Halpern et al. (2013) describe as "test-bed urbanism." In the context of test-bed urbanism, present infrastructures are leveraged to perpetually "test" urban futures unfolding at spatial and temporal scales beyond the local.

Embodying both progressive local politics and entrepreneurial global politics, the Smart Light project came with an overarching *anti-political* attitude, creating a context in which the discrepancies, frictions and tensions between both political forms was not made visible, debatable and contestable. Rather than openly engaging with the different interests, value-models, moralities and goals of both spheres in which the project unfolded, the project depended on a separation between them. In material sense this meant that the (non-) realization of the smart lampposts at the local level took place independently from the realization of the "generic lamppost" at the global-economic level.

Moreover, just as the material affordances of the posts were imagined to affect political change through "sensing," so was assessing the success or failure of this ambition also a matter of sensing. The opening day provides us with a useful illustration regarding the political consequences of this reliance on sensing as a form of urban governance. On that bright spring day in 2016, as the CTO pressed the button on his app to illustrate the workings of the lampposts, it was left to individual onlookers to decide for themselves how to interpret what they saw. Taking place during day-time on a sunny afternoon, it was unclear whether the lampposts responded to the smartphone's cues or not.

Notes

ⁱ The analysis relies on various research activities, including interviews with key smart city stakeholders from both the public and the private sector, including Smart Light project partners, in 2014, 2015 and 2017; and a round-table session on the Smart Light project organized in the context of the *People, Data & Power* workshop in 2016. Some of these interviews were conducted in the context of a co-produced documentary (Zandbergen and Blom 2015). I also conducted interviews with entrepreneurs and employees at five establishments at the Hoekenrodeplein square; and collected meeting notes, internal reports and online documents pertaining to the Hoekenrodeplein pilot and the E3 Smart Light initiative.

ⁱⁱ Roche (2014) sums up a range of other terms, such as “‘urban intelligence’ (Komninos, 2006; Simone and Ratti, 2011), ‘WikiCity’ (Ratti et al., 2007), ‘City 2.0’ (Eychenne, 2008; TEDxCity2.0, www.ted.com/pages/tedx_tedxcity), ‘ambient city’ (Streitz, 2011), ‘real-time city’ (Kloeckl et al., 2012) or even ‘ubiquitous city’ (Jackson et al., 2011; Shin, 2009).” (Roche, 2014: 703)

ⁱⁱⁱ “Brief gezamenlijke inzet E3 en kabinet om internationale concurrentiepositie te versterken”, (“Letter indicating collaborative effort E3 and cabinet for better international competitive advantage”) signed October 27, 2011.

^{iv} MAC stands for Media Access Control and is the unique identifier for networked hardware devices.

^v Report *Information Meeting Hoekenrode Renovation*, 2 december 2013, sent to me by the DIVV project manager.

^{vi} <https://www.amsterdameconomicboard.com/nieuws/smart-light-op-het-hoekenrodeplein-gerealiseerd>

^{vii} Some examples are Mark Halper, February 12, 2016, “Philips teams with Cisco and Dutch energy utility Alliander on smart lighting project” <http://www.ledsmagazine.com/articles/2016/02/philips-teams-with-cisco-and-dutch-energy-utility-alliander-on-smart-lighting-project.html>; De Ingenieur, 22 juni 2014, “Aanpasbaar licht op Bijlmer-Arenaplein” <https://www.deingenieur.nl/artikel/aanpasbaar-licht-op-bijlmer-arenaplein>; and the more generic testimonies of the involved corporations to deliver smart lighting solutions such as Cisco’s *Kinetic for Cities Lighting* (<https://www.cisco.com/c/en/us/solutions/industries/smart-connected-communities/city-lighting.html>) and Philips’ *Connected Lighting* project (<http://www.lighting.philips.nl/systemen/connected-lighting>)

“<https://www.deingenieur.nl/artikel/aanpasbaar-licht-op-bijlmer-arenaplein>”

^{viii} See for a discussion of the “schizophrenic politics” of digital societies for instance Barbrook and Cameron 1995, Turner 2009 and Zandbergen 2016.

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