ECOLOGICAL URBANISM 1
EMBRACING THE URBAN GLITCH IN SEARCH OF THE (EXTRA)ORDINARY: A NEW PARADIGM FOR SMART CITIES

ABSTRACT
The role of new technologies in the built environment to enhance and better the experience of cities is one of the highly anticipated outcomes of the advancements in digital technologies in recent years. The ‘smart city’ model enters the debate by employing technology as a strategy to optimize processes and operations, increase efficiency of systems, and monitor urban dynamics to ultimately get a precise control over the whole city. The assumption of the presented research is that the implementation of the smart city concept, as it is commonly described, understood and deployed, would reinforce the current tendency of shaping and evolving cities as digitally driven, routine inducing built environments, eventually leading to technology-centered standardized patterns of living.

Drawing from an ongoing research at REAL (Responsive Environments and Artifacts Lab) at the Harvard Graduate School of Design, this paper introduces a new take on the framing and creative potentials of situated and connected environmental technologies. In particular, it proposes the concept of Urban Glitches as a new paradigm for an alternative use of technology as a mediator of the relationship between individuals and the built environment. The research leverages on the notion of glitches as a trigger for creativity and more specifically how these concepts of glitches—caused in particular by human-nonhuman interactions within the built environment—can translate to the urban space of the city. It articulates on how these are important elements to help create technologically-driven conditions other than efficiency, which is widely the driver in the approach to smart cities.

The paper ultimately argues that by creating a healthy tension through the introduction of the notion of urban glitches to counter the current smart city discourse, designers can develop environments that foster creativity, have a better ambiance, and lead to pleasant and unexpected outcomes throughout the whole city. Urban glitches that are unintentional, temporary, democratic, creative, and qualitative, ultimately become a recipe for the design of technologically augmented or ‘smart’ cities.
PROBLEMS WITH CURRENT SMART CITY MODELS

Today, more than ever, we feel the technological presence as part of our everyday life. The all-pervasive nature of digital information and technological interaction affects all scales: from our bodies to the larger urban contexts we occupy and the infrastructures that support them. Looking at cities, recent models of conception and evolution—under the umbrella of the smart city paradigm—point towards performance- and efficiency-driven systems, spaces, and processes that, making use of network, sensing, and big-data technologies, aim to optimize operations and to be aware of the whole urban dynamics’ framework.

Being perhaps yet one more attempt to rely on technology as a way of thinking to the future of our built environment, this smart city approach resulted in the definition of a few characteristics that a city should manifest in order to be defined ‘smart’ (Greenfield 2013):

A. Predictable
A smart city is made of layers of urban systems that operate under specific rules and functioning mechanisms. Having the control over these systems makes it easier to predict future developments of the systems themselves and, by extension, of the whole city. For instance, the use of sensors to monitor and control traffic systems allows understanding of traffic patterns, make the infrastructural operations more efficient, and ultimately predict the whole traffic spectrum of a city.

B. Overspecified / Long-term Planned
If a smart city is the result of the juxtaposition of technologically-driven systems, then it follows that these systems need to be designed very precisely with the objective to last for a long time and then monitored with sensors to make sure that the operations are performed as planned. Such a level of specification implies that the smart city is able to anticipate, from the design stage, the potential use of the built environment by its occupants.

C. Platform Based / Top-down Controlled
The monitoring and control of intricate relationships between systems assume a centralized management process. At the political level, this translates into a top-down approach; whereas at the technical level it calls for the use of a proprietary platform. The result is a seamless coordination of functioning mechanisms and activities across the city. Rio de Janeiro’s operation room and the Living PlanIT’s Urban Operating System are good examples of such platform based, top-down controlled smart city operations.

D. Efficient / Optimized
A smart city needs to operate at its best in order to be competitive with other cities. All its mechanisms, processes, and players are therefore geared towards high levels of efficiency and productivity. Technology thus becomes a necessary instrument to optimize the functioning mechanisms of system processes and urban flows.
E. Quantitative
In the smart city, sensing and big-data technologies allow the capture and analysis of data to yield insights of individuals’ behaviours in both the physical and the digital environments. As anticipated by Siemens, “[s]everal decades from now cities will have countless autonomous, intelligently functioning IT systems that will have perfect knowledge of users’ habits and energy consumption, and provide optimum service” (Siemens 2008).

More than in better defining the actual role of citizens in this scenario (several research initiatives refer indeed to the ‘smart citizen’ concept, see Hemment et al.), what smart city models lack is rather a clearer articulation of the potential uses of new situated and responsive technologies in the built environment. In the smart city, technology is employed to achieve an objective understanding of the urban dynamics in order to reach optimal states of fixed equilibrium, crystallizing human and material operations within the city (Picon 2013). As stated by Saskia Sassen, “the model of intelligent cities as propounded by and the telepresence efforts of Cisco Systems misses this opportunity to urbanize the technologies they mobilize, and futilely seeks to eliminate incompleteness” (Sassen 2011).

In fact, standardization, optimization, and efficiency leave no room not only for ‘incompleteness,’ for creativity, and even serendipity in the processes of urban development. Anthony Townsend puts it right when he says that “[i]f we program all of the randomness out, we’ll have turned [the cities] from rich, living organisms into dull mechanical automatons” (Townsend 2013). A-priori and top-down implementations of new technologies in built environments that are designed and structured to perform like systems induce routine operations and make cities less interesting, repetitive and even boring, killing the (extra)ordinary. And the use of sensors for monitoring and controlling end up reinforcing this tendency. As pointed out by Rem Koolhaas (2015):

> The digital is essentially beyond exhaustion an endlessly upgrading and mutating integration of the city, its architecture, its constituent elements, and its bodies. If the digital is about to deliver us to a sensor culture, does that imply an endless reinforcement of routine a system proud to deliver more of the same? These relations can only turn in on themselves: the world as an endless, tautological repetition of cause and effect.

But how can the spaces, infrastructures, and places that define the social experience of tangible environments not incorporate elements of inherent spontaneity, informality, and even error that let us break digitally-driven fixed patterns?

Today, for all the right reasons, many new cities are being planned (Exhibitions Group India 2015) or existing ones are being retrofitted, to be ‘smart,’ and the question of redefining the concept of smart city is therefore of fundamental importance for the future.
development of the build environments we live in. This on-going research introduces
the paradigm of urban glitches to act as a generative and creative potential for the typi-
cal smart city approaches.

WHY A GLITCH AND WHY AN URBAN GLITCH?

Glitch is a term mainly used to describe a malfunction caused by voltage actuation, for
instance a signal failure in the circuit. According to Rosa Menkman (Menkman 2011),
"a glitch occurs on the occasion where there is an absence of (expected) functionality,
whether understood in a technical or social sense." Thus, in its definition it incorporates
the notion of failure and temporality, of a sudden and unforeseen slip in the ordinary
and expected flux of events.

In fact, a glitch is also defined as a temporary, transient fault in a system that corrects
itself. Glitches are cracks, frictions that create 'openings' in a particular system, reveal-
ing new meanings and unexpected outcomes of the system itself. A glitch can be also
seen as a break from an expected or conventional flow of information, materials, and
processes in a system, often resulting in a perceived accident or error.

As opposed to its typical negative connotation, the ‘urban glitch’ finds here a positive
meaning and a generative quality. There needs to be a distinction between failure, which
is destined to be overcome, and urban glitch, which may diverge into new processes
and avenues for experimentation and innovation. In this respect, the urban glitch brings
the system outside of its comfort zone of functionality and effectiveness. It exposes a
situation that may undermine pre-established assumptions and certainties. In doing so,
it opens up a novel space for creation through the combination of unexpected elements
to generate experiential short circuits where urban evolution can find new ways and
paths. When glitches relate to the built environment, people find new connections
with places, shifting the relationship from the ordinary towards the unexpected and
the unpredictable.

Urban glitches thus afford additional means of expression and creativity. When indi-
vidual agents discover mechanics outside of the rigid convention or norm, the system
is opened up to feedback. Opportunities then emerge to explore narrative elements
that subvert the designer’s intentions. The urban glitch, in its lack of an established,
stable, and well-defined form, in fact reminds the designer about the evocative power
of ambiguity. It claims the necessity of letting enough space for interpretation and impro-
visation, for experiences and places into which different meanings can be projected. It
constitutes a demand for enabling conditions that will leave sufficient elbow room for
informality, for uses that are not established, for surprises and novelties.

This research thus embraces the concept of urban glitch for seeking a new understand-
ing of the role of responsive technologies in human-nonhuman interplays within the
built environment, where an alternative look at the relationships between the physical space and the subjective experience engender approaches beyond the current smart city approach. Five qualities of glitches in the city or urban glitches are here defined:

A. Unintentional
Rather than being the result of a planned intention, an urban glitch is the outcome of unpredictable circumstances. For instance, designing urban interventions that allow for interactive use by citizens shift the experience from passive use to creative appropriation, as the “emergent digital hybrid spaces” experiments by Claude Fortin demonstrate (Fortin et al. 2014). In this case, the design needs to be sufficiently open, accessible, and pliant to accommodate multiple interaction scenarios that can give life to unpredictable experiences.

B. Temporary
Although an urban glitch is temporary, it causes permanent effects and profound repercussions that can hardly be predicted. The focus here is not on the effects of major structures or interventions that were designed to be temporary that eventually became permanent such as the Eiffel Tower, but rather on a project or an intervention with a specific timeframe that leaves a trace and causes changes in the built environment. The urban installation work of artists such as Krzysztof Wodiczko (McCorquodale et al. 2011) or Lucy Orta (Studio Orta 2006) with a commentary on social change is a good example of temporary glitches in cities.

C. Democratic
An urban glitch is democratic in the sense that it results from collective preferences, and it is widely understood and embraced. The smart city approach puts the ‘controller’ or the mayor at the top of the decision making processes and platform-based technologies further emphasize this ‘control.’ An urban glitch shifts the perspective by creating opportunities for technology to be used in a way that allows for dynamic hierarchies of participatory urban engagement and empowerment.

D. Creative
An urban glitch is not only creative in its generative form, but it also sparks creativity by offering new perspectives and opportunities. Research in different fields shows that creativity and efficiency are at odds. Efficiency is about optimization and creativity is about making unexpected and hidden connections. Smart cities strive for optimization and thus hinder creativity. An extreme example is a place like Brooklyn (New York), which could not have existed if it had been based on top-down, efficiency-driven urban development.
E. Qualitative
An urban glitch allows for mindful experiences of the built environment, sometimes even revealing the unexpected. The result is, for instance, the production of third spaces through the use of situated technologies, where the spatiality of human life is embraced (Soja 1996). Third spaces are about the mindful experience of living a physical and social environment, even in unconventional ways, and are in fact produced through social interaction and appropriation, rather than rational planning (Oldenburg 1982) and quantitative analysis of urban dynamics.

CONCLUSIONS: RESPONSIVE ENVIRONMENTS IN SMART CITIES
The assumption in this on-going research is that by creating a healthy tension through the introduction of the notion of urban glitches to counter the current smart city discourse (Figure 1), designers can develop responsive environments that foster creativity, have a better ambiance, and lead to pleasant and unexpected repercussions throughout the whole city. Urban glitches ultimately become a recipe for the design of technologically augmented or smart cities.

The paper argues that new types of smart cities or 'post-smart cities' can emerge as a balance between the typical characteristic of smart cities i.e., predictable, overplanned, top-down, efficient, and quantitative and generative qualities of urban glitches i.e., unintentional, temporary, democratic, creative, and qualitative. It ultimately suggests that the built environment should be designed in ways that would foster the emergence of states of urban glitches, creating the conditions for post-smart cities to be developed. Further research will lead to the definition of alternative design strategies for the actual creation of conditions for urban glitches. Concepts and prototypes will be particularly tested in the City of Bergamo (Italy), as part of a research collaboration between the REAL lab at Harvard GSD and the University of Bergamo.

Figure 1
Post-smart cities can emerge from an healthy tension between the current smart city approaches and the notion of urban glitches.
REFERENCES


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Allen Sayegh is an architect, designer, an educator and the principal of INVIVIA, an award-winning multidisciplinary design firm. He is Associate Professor at Harvard Graduate School of Design and the director of REAL, the Responsive Environment and Artifacts Lab at Harvard. Sayegh’s academic research and professional practice span a period of more than two decades working on projects of varied scales. He has taught at different institutions and has worked on many different projects throughout the U.S., Europe, the Middle East and Asia. His courses and practice focus on technologically-driven architectural design, exploring potentials of media- and technology-integrated built environment, interaction design, and the study of architectural and urban space through the impact of changing technology. His work is characterized as the synthesis of architecture, digital art, and design in deriving innovative architectural human interfaces and responsive environments. Sayegh’s Lab at Harvard, REAL, looks into the future of built environments from a technologically augmented point of view with a strong focus on sustainability and longevity of responsive and technologically design driven environments.

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Stefano Andreani is a licensed architectural engineer and educator interested in the strategic implementation of architectural technologies for innovative design solutions. As Teaching and Research Associate at the Graduate School of Design of Harvard University, he pursues research within the Responsive Environments and Artifacts Lab (REAL), exploring alternative relationships between the individual and the built environment and the role of responsive technologies in augmenting the qualities of places and experiences in cities. Andreani lectured at Harvard GSD, MIT, Architectural Association, and New York Institute of Technology among others, and published, presented, and exhibited internationally in numerous venues. He received a Master in Design Technology from Harvard GSD, and a Master in Architectural Engineering and a Bachelor in Civil Engineering from the University of Perugia, where he served as a Lecturer in Architectural Technology. Merging academic research and design practice, Andreani is the Head of INVIVIA Europe at INVIVIA Inc., a multidisciplinary design research and user experience studio. As technology consultant, he has also worked on the design of high-rise buildings in China and a space center in Italy among others.