Building urban futures through an exploratory project: how can innovative design approaches be used to regenerate urban planning routines?

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Abstract: Technological change and emerging social concerns signal the advent of new economic innovations and social inclusion challenges for cities, in addition to the transition to an ecological and smart society. These changes raise questions about urban planners' routines, which may need to be reviewed. They clearly call for a review of planning processes, especially in urban projects, in order to explore the potential of new paradigms. Some private and public companies have responded to this challenge, with convincing results, by developing tools based on innovative design theories. One of these methodological tools, Definition-Knowledge-Concept-Proposition (DKCP), was used to regenerate the range of planning options of an urban district in Montreal, Canada. Elected officials wanted to adopt a planning vision for the next 20 years. Some observations emerge from the use of the DKCP method: 1) the introduction of a necessary "deterritorialization" at the beginning of the process (failing this, spatial constraints act as cognitive fixations, limiting expansive thinking); 2) disciplinary decompartmentalization, in order to integrate a diverse range of knowledge and disciplines (engineering, health sciences, arts, agribusiness, etc.), to rethink the identity of projects and develop new routines among planners.

Keywords: Urban futures, routines, rule-based design, innovative design

Introduction: the necessary paradigm shift in urban planning as a design activity

In the coming years, most Western cities will face increasingly complex challenges related to the emergence of many social, environmental, economic and technological changes. In particular, this is reflected in a new view of traditional urban activities:

- In many cities, inequalities in access to housing become critical, which calls for a reinvention of urban density. Housing will be marked by flexibility and affordability, the search for a "enjoyable density", the reinvention of the family unit and nomadism. This transformation of housing may heighten tensions between permanent and temporary residents of neighborhoods, or create social, economic and even environmental disparities between central and peripheral neighborhoods;

- The world of work will face strong mutations: it will be influenced by an explosion of forms of work and workplaces, open innovation and the emergence of a community of innovations, robotics and experiential work. However, our cities are structured under a logic of daily home-work commuting and highly segregated activities. The redevelopment of activities in the city is also likely to create tensions between The reorganization of activities in the city may also create tensions between mobile, multi-purpose and urban youth compared to older, sedentary, off-centre youth who holds a single job that fully satisfies them;
- Leisure time faces the challenge of social inclusion and sustainability, while having to resist the pressure of algorithmic standardization. Entertainment will need to be redesigned to take into account the individualization of leisure, the bursting of "urban rhythms", but without increasing inequalities. The frenzied development of digital and immersive technologies may lead to new experiences for which no organization (city, museum, theaters) is currently capable of hosting the content.
- Finally, the current environmental crisis (climate, local atmospheric pollution) requires cities to urgently reinvent their mobility system. Proximity could be redeployed by the desire for experiential mobility, the offshoring of all activities, mobile internet, ubiquity. The changes in the nature of the activities set out here should bring about new forms of mobility that are more flexible and experiential, but also less predictable.

Many cities are translating these challenges into policy statements that take the form of concrete utopias: the carbo-neutral city, the circular city, the smart city. In addition, cities must ensure that the necessary living conditions are in place to ensure the social integration of all populations, as well as economic prosperity.

These challenges and the complexity of implementing effective responses to them thus raises questions about the practices, tools, and methods of intervention in urban planning. They raise questions about traditional instruments, such as urban planning, zoning, financial tools and other policies, as to their ability to properly equip upstream public policies (Ascher, 2006). The practice of urban planning thus takes the form of a "rule-based design activity1": it frames collective action to make it effective in a given context, according to rules that ensure predictability. However, it is less convincing as a way to guide change in the long run.

In recent years municipal organizations have tried some new practices or approaches to renew their processes and instruments. For example, in terms of processes, the City of Copenhagen has encouraged the networking of contributions by urban planners, citizens and designers. Its "Create Your City" project has helped shift the city planner's perspective towards the less technical and more humane aspects of planning (Munthe-Kaas, 2014). For example, on instruments, several North American and Canadian cities have formalized new urban planning tools and reworked the zoning with a form-based code to integrate the user experience (installation of benches and landscaping, display and other visual cues, etc.) (Duany and Talen, 2007). This enriched conception of rule-based urban design may propose new directions for the work of the town planners, but it remains, however, insufficient to reinforce the capacity of urban planners to innovate. It avoids revisiting the identity of design objects (what is

[1] According to this formulation, which draws on ideas proposed by Schön (1980, 1993) and Simon (1969), town planning constitutes a "design discipline". The goal of urban planning and the work of the urban planner is to "conceive" of the right sequence of problem solving, exploration, informed decisions and experimentation to guide the organization of a geographic area in order to produce, in the long term, the greatest collective satisfaction.

a public square, urban density, or smart and sustainable mobility?) and, in its place, seeks to capitalize on and disseminate good practices.

In spite of the obvious interest of these developments, there remains a gap between the scale of contemporary challenges and the capacity of these tuned instruments of design - even those that are enriched - to respond appropriately. The urban planner still has difficulty reconciling the disparities that exist, for example, between an abundant supply of active and collective transport in urban centers and the outskirts of the city, areas where car ownership is essential.

To ensure that urban planning is fully able to respond to these challenges, we propose focusing on the practices, references and paradigms that structure the routines of urban planners.This concept of "routine" has been used in organizational theory to characterize activities and to think about a genealogy of productive models, associated learning dynamics and possible performance (Brem 2017, Coriat and Weinstein 1995, Nelson and Winter 1982). The interest of this work lies in being able to closely analyze professional practices in order to understand what makes innovation possible and to emphasize their framing effects.

One of the challenges is how an innovative design culture can take hold in municipal organizations. A first reading of the legal and educational framework suggests that this has not yet occurred in the practices of urban planners in Canada in general and in Quebec in particular. Legal and regulatory tools favor normative or prescriptive considerations and ignore the activity of design. On the professional development side, university urban planning programs focus on learning and applying a variety of regulatory audit tools. Except for a few exceptions (Scherrer *et al.*, 2017), there is no training in Québec in how to innovate, as there is in most architectural or design training programs.

However, such methods that make it possible to revisit the identity of routines can be found in private organizations that are facing rapidly changing technological or social contexts (Arnoux and Béjean, 2015, Potier, et al. 2015). To anticipate these changes and force adaptation, they intentionally introduce elements of rupture. For example, they will create new roles for the actors, explore new identities for objects, and enable the regeneration of tasks and jobs (Le Masson *et al.*, 2017). The transposition of these methods to the public sector is currently limited to a few organizations with specific missions (moving people in urban Paris (Amar and Michaud, 2009) or between urban areas with the French railway company (Laousse and Hooge, 2015)). However, by associating them with forward-looking methods (Durance 2010, Durance and Godet 2010), they could probably be applied in municipal organizations.

Given this increasingly complex context for cities, what would these future professional planners' routines look like? We hypothesize that an existing set of innovative routines developped in business companies could inspire public urban organizations. This set of innovative design routines is understood as four successive activities called DKCP (where "D" is a common definition of desired explorations, "K" is an assessment of known and unknown knowledge, "C" is the generation of concepts and "P" is their transformation in proposals or projects) (David and Scheffer, 2017, Hatchuel *et al.*, 2009, Le Masson *et al.*, 2011). Can this set of routines can be transposed into the urban public organization? If so, will the routines be identical or take other, specific forms?

These innovative design routines in private enterprise and their transposition to urban public organizations have been the subject of some research (Georg et al., 2011; Croisel, 2014). These routines are yet far from being systematized. We intend to contribute to this discussion. First, we will propose the value of routines as a way to better understand the design activity in urban planning. We will then explain the usefulness of intervention research as a methodology for framing the necessary scientific approach in urban planning when exploring the unknown. Third, we will present a specific case of experimentation that took place in a Montreal organization. Finally, we

will present a sketch of a set of routines in the four phases (D-K-C-P). We will conclude by specifying the usefulness of these steps to the future of the practice of town planning.

1. Professional routines at the service of creativity

Let us return to this notion of a professional routine. In our opinion, it possesses indispensable virtues for the members of organizations, both private and public, who wish to implement responses to social and technological change. It is also useful for understanding the work of urban planners. In particular, we will present a theoretical model that proposes moving from the current paradigm to an innovative design paradigm, thereby revising the identity of the routines.

1.1 Professional routines to formalize organizational learning

In general, the notion of a routine refers to its comforting dimension: a series of habits which, repeated daily, structure the life of each and every one of us, as is the case in our daily travel to and from the workplace. In organizations, individual habits are transposed into routines that formalize behaviors shared by colleagues, forging standardized behaviors (Hodgson, 2008). The most effective of these behaviors eventually become rules to be followed by all. The word "routine" also refers to the repetitiveness, disenchantment and lack of surprise in day-to-day life. This can even become enslavement and alienation from individual desires (Juan, 2015) by preventing workers from trying out new tasks or services. Finally, "routine" may refer to favoring ready-made solutions that are not always adapted to the changing social or environmental context (Knudsen, 2008).

Routines can also be something positive. The most ordinary gestures and processes are easily transmitted within an organization. A new employee will quickly be able to rely on these skills, methods and tools shared by public or private companies to quickly carry out their tasks. Nelson and Winter (1982) pointed to the particular evolutionary context of organizations, in which they must constantly take into account social and technological changes. How these organizations respond becomes part of their particular identity, a formula of codified language that defines the organization's personality. It is compared to the role played by genes for human, in that the manner of formulating this response determines the behavior of the firm's employees. The strength of an organization then becomes its ability to continually adapt and regenerate its routines to threats that could undermine the organization. It must learn from the inside, letting its employees question the methods, tools and processes so that they can be constantly improved.

1.2 Turning Design Routines into Innovative Design Routines in Municipal Planning

Thus, one should not see professional routines as ways to freeze an organization in an immutable space-time. Routines adapt and evolve in response to the new tools, methods or processes that employees adopt (Coriat and Weinstein, 1995). They also help support a learning dynamic within organizations by empowering employees, allowing them to see problems from different angles that otherwise might not have emerged (Miner *et al.*, 2008). At the same time, in large public organizations such as cities, routines can create path dependencies (Teece *et al.*, 1997). Routines optimize past structures rather than favoring disruption and demanding changes in how they are implemented. Conversely, Labatut *et al.* (2012) have shown that the techniques and methods used can produce unsuspected generative effects that completely change the practices of organizations and produce a new range of actors. The effects of innovations are not only felt on the objects themselves, but also on those who produce them.

It is our opinion that the above discussion of professional routines highlights the particular challenges faced by urban planners' practices in municipal organizations. On the one hand, the empowerment dimension of urban planners highlights the rigor with which they use their various instruments to solve the problems presented to them, without being given the time or the opportunity to question the ins and outs. On the other hand, the dimension

of path dependencies is illustrated by planners' reflex to reproduce in new projects or approaches what may have worked well in the past, without enriching it in any particular way. The long lives of public administrations and the sequence established to avoid displeasing one or another of the stakeholders, which applies to the two previous dimensions, makes it difficult to effect a change in direction once a process has started. However, to obtain the disruptive effects of innovation, it becomes useful to place planners from the outset in a position to generate unsuspected effects.

1.3 Exploring an original model for conceptualizing urban planners' routines

Thus, it is also necessary to question the professional identity of urban planners by having them ask themselves how to regenerate regulated routines (professional routines that support their work, new ways of conceiving and doing, their repertoire of knowledge and tacit actions, the ability to act and learn). Rampa *et al.* (2017) formulated another set of criteria in a study conducted in a public administration (an energy producer and supplier in Québec): the ability to identify the missing knowledge in the dominant design of an object; the ability to produce knowledge expansions that enhance the initial functions of the dominant design; and enthusiasm and excitement about the creative process.

To characterize the design regimes of municipal organizations and their attempts at enrichment, we propose an original model of analysis. The model (as seen in Figure 1 and detailed in Table 1) combines the relation to the objects under design and the type of professional routines:

Figure 1

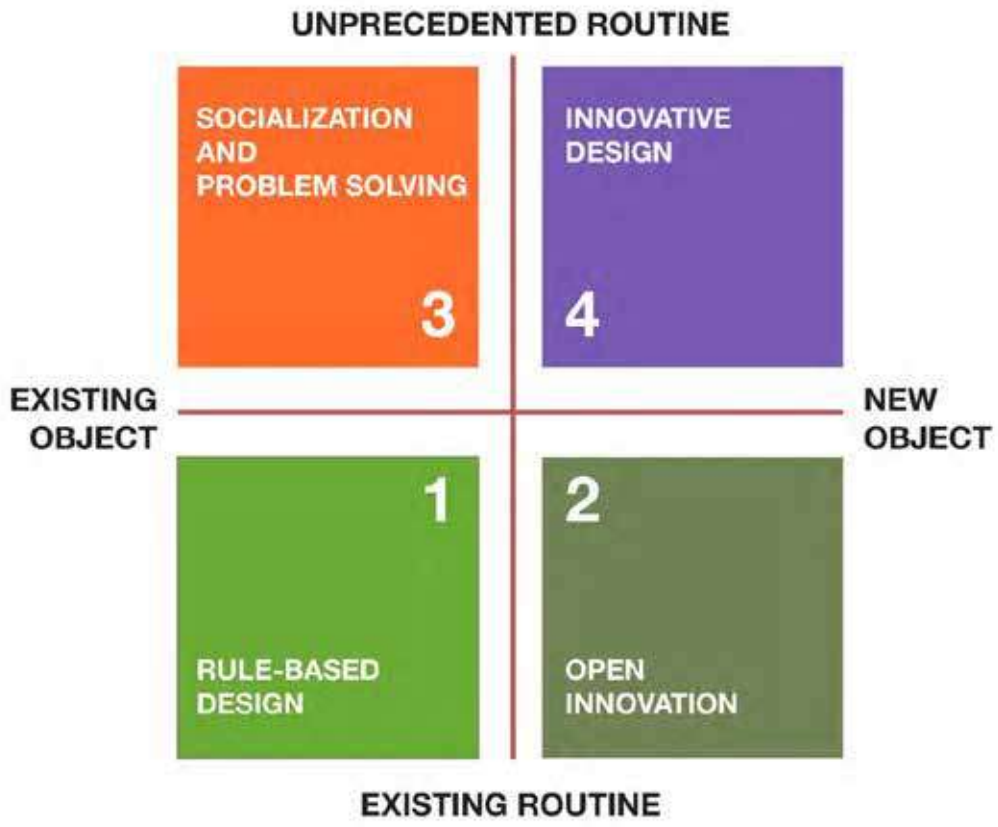

Table 1

	Combination	Description	Benefits	Limits
Quadrant 1	Existing routine, existing object	Includes the well-known, traditional practices of urban planners, strongly marked by detailed knowledge of objects and past learning, but also by tools from the regulatory, legal or legislative framework, budgets, and best practices.	Makes it possible to ensure consistency and common identity in the profession	There is a danger of not being up to the challenges that will arise. The possibility of limiting ourselves to path dependencies is also present.
Quadrant 2	Existing routine, new object	Consisting of open innovation practices. This is often carried out by a consultant who has a method that is applied consistently, regardless of the context. Standardized activities (architectural or design competitions) to encourage urban innovation, for example in eco-neighborhood projects (Susse *et al.*, 2011), also belong in this category. In France, the exploration study agreement is an excellent example of enriching the traditional call for tenders. However, these approaches do not allow the municipal organizations to learn about the innovation process, since they rely on the invisible routines of others (those who compete).	Makes it possible to recognize a quick contribution of new knowledge.	Learning ability may be low. The municipal organization may also be able to steer the content. Finally, there is a danger of the "black box" effect, i.e. participants only share part of their content.
Quadrant 3	Unprecedented routine, existing object	Creative tools to play with the (re)organization of forms, activities, actors. Typically, these are knowledge-sharing activities (Lehman, *et al.*, 2015),	This is an enriched public participation formula. It encourages better contributions from	Generally proposes an original reorganization of the existing routine, but one that is

		that foster new routines such as hackathons or brainstorming. On the other hand, these positions remain in the existing paradigm. They favor the sharing of existing ideas, without raising questions about their foundations (Agogué *et al.*, 2014).	everyone in involved in the thinking process.	thought about and discussed under the same parameters.
Quadrant 4	Unprecedented routine, new object	Composed of tools or methods to facilitate the process of disruption in the design of urban referents, to call into question the identities of objects or actors. The challenge lies in whether these innovative ideas can be reintroduced in projects. Examples of these kinds of products are more common in private companies (Arnoux et al., 2015) and parastatal organizations in France (Hooge, *et al.*, 2018).	Opportunity to identify new spaces of values, new actors and the resulting practices.	May be very creative, but this approach can neglect the important task of returning to transform the current organization. One can also stay too close to the design brief frame and limit the expansion of knowledge.

Currently, urban planning routines are essentially confined to the first quadrant of the diagram, with some attempts to move to quadrant 2 and 3 to enrich them. On the other hand, what is learned remains the property of the designers, and the participants remain confined to their usual practices. However, it is only in the fourth quadrant that the planner can truly attribute new identities to objects, which will eventually condition creative professional routines (Le Masson *et al.*, 2017). The fourth quadrant therefore represents a new space which deserves to focus on it. Our hypothesis is that this innovative design routine can be generated by a set of four phases and their interrelationships.

2. Methodological relevance of the intervention study and its DKCP formalization tool

To illustrate this model, we will now present a real case that took place in Montreal. This section presents the method used to make innovation take root in a municipal organization.

Our proposal to generate unprecedented routines for urban planners requires the identification of new forms of reasoning, to describe and explain new realities (new routines, new urban objects, and the relationships that are established between them). Since we are in the field of manufacturing the city of the future, these new reasonings must be based on observations of real situations.

In this context, the data must be produced within organizations with real urban problems. This requires strong and consistent investigative methods that position the researcher in a position of listening to practitioners. For all these reasons, we believe that methodologies inspired by action research and its derivatives, particularly research-intervention or research-experimentation, deserve our full attention.

2.1 Intervention research as a mode of knowledge production

Two points of similarity between the approaches used in action research and in intervention research may be summed up by the fact that the search for solutions and the validation of these solutions by the actors constitute mutually supportive and self-sustaining operations. Although action research and intervention research both come from "field" analysis, intervention research is unique in that it establishes a space for collaboration between actors and a researcher who jointly seek solutions that will allow them to both contextualize the problem, but also test possible solutions with the actors (David, 2002).

On the other hand, intervention research is not only about producing knowledge for potential action, it is also about producing knowledge through action (Hatchuel, 2000). Like action research, actors adopt a variety of strategies designed to produce consequences, each of which is weighed and analyzed. On the other hand, from this perspective and more specifically than in action research, intervention research implies the involvement of the researcher-intervenor in the production of the action. This is not only intended to guide the reflections of stakeholders, but also to have stakeholders actively involved in the process of defining this (collective) action.

Intervention research is therefore not compatible with observing participants detached from stakeholder analysis in action. The "laboratory" model - in which the actions of the participants are scrutinized - gives way to a field study in which it is possible to interact with real actors defending legitimate personal or collective issues (David and Hatchuel, 2014). The researcher-intervenor will need to respond to stakeholders' questions. The answers can and will have to take into account the particular context experienced by these stakeholders.

2.2 Mobilization of a tool for an innovative design process: DKCP

To clarify the nature of these innovative design routines, we took this model as our hypothesis. To identify the richness of this disruptivity, we used a methodological tool inspired by the theory of innovative design (Hatchuel and Weil, 2003). This tool, called "DKCP" (Amar and Michaud 2009, Hatchuel *et al.*, 2009), therefore favors the formalization of creative ideas in response to a particular problem formulated in neutral terms. The tool takes its name from the four main phases of its reasoning (Abramovici *et al.*, 2016):

1. A definition and initial framing of possible innovation fields (phase D);
2. A pooling of knowledge useful for reflection, with important work to identify out-of-the-box knowledge (phase K)
3. An expansion of the knowledge, translated into new concepts with high disruptive potential (phase C);
4. The translation of these disruptive scenarios into concrete projects (phase P).

This reasoning relies on the formulation of stimulating briefs[2]. By adding new attributes, drawn from a knowledge disjunction, it is possible to partition this brief, thereby opening new avenues of exploration from a bold (re)

[2] A brief is a bold formulation of a problem, an original description of a way to solve it. At first glance, it does not have a logical status (Hatchuel and Weil, 2002), so it is considered prima facie neither true nor false. An example

formulation of the problem (imagine, for example a retractable public square rather than simply a comfortable public square) (Le Masson *et al.*, 2010). The process of expanding knowledge and concepts leads, after a few steps, to the creation of a tree of new functions, uses and designs, unexpectedly leading to one or more unprecedented prototypes.

3. Results: An application of DKCP to the Montréal territory

The first experiment conducted with the DKCP method was carried out in the *Rosemont-La Petite-Patrie* Borough, one of the 19 boroughs of Montréal[3]. This municipal organization asked the team at "Lab Ville prospective" to initiate a reflection to develop original approaches to land use planning (Abrassart *et al.*, 2018). The borough expressed its initial vision in the following terms: "Live, Work and Play within Walking Distance in 2037" (more simply called P37). It was aware that, in the next twenty years, it will be strongly transformed by the many social, economic and technological changes mentioned at the beginning of this text. These changes will have an impact on the routines practiced by urban planners. It was therefore particularly stimulating to investigate these changes by thinking about the future. These changes could also generate new needs, inspire new lifestyles or generate a new form of governance, more responsive and forward-looking. This municipal entity wanted to better identify these developments, which will have consequences on its provision of services. The four DKCP phases were applied continuously over a period of about five months (as shown in Table 2).

Table 2

	Phase	Description	
Pre-project	D	Conducted by the Université de Montréal team in close collaboration with a "project team" made up of professionals and executives (half of whom came from the planning world). This phase ended with the establishment of a schedule of exploration activities. **Deliverables:** a calendar of activities and a roadmap specifying the desired learning	Seminar[4]
	K	This knowledge was produced by the University of Montreal team in close collaboration with three speakers. Their presentations focused on experiential mobility, the city and aging, as well as "third places"[5]. The	

of a brief: design a boat that flies. In appearance, a boat floats but does not fly. By applying principles specific to aviation, it was possible to design the hydrofoil (Agogué *et al.*, 2014)

[3] Montréal, along the St. Lawrence River, is the second largest city in Canada in terms of population (3.4 million) and is a metropolitan area and an island (2 million inhabitants) composed of 16 cities, including Montréal (1.8 million inhabitants), itself divided into administrative units called "boroughs" whose size and area vary.

[4] This seminar took the form of eight meetings spread over five months, with meetings every three weeks. It was punctuated with preparatory exercises for the discussions, creative exercises, conferences, and disruptive activities.

[5] Oldenburg (1989) has proposed the concept of third places to identify those spaces that are neither places of work nor places of employment (cafes, bars, restaurants), where one goes for entertainment or to work. These places may, however, become new friendly spaces as found in all urban fabrics.

		exploration of current trends and their extrapolation into the future allowed the team to imagine four evolution scenarios by variables, called in this case "evolution hypotheses". Each of these hypotheses was briefly described to the project team in order to transparently share the thinking behind the development of these so-called "evolution hypotheses". These trends have relied on identifying "non-knowledge" that would potentially be crucial to innovation. This phase concluded with the formulation of projector concepts (which can be understood as new spaces of values) or triggers (which prepare the design activity of the next phase). **Deliverable:** disruptive projector concepts	
	C	This phase began with the organization and holding of a prospective codesign workshop with borough stakeholders. The codesign workshop encouraged reflection on the transformations expected by the borough over the coming years in order to better address them. This phase ended with the formulation of a new prospective scenario, a narrative of fictitious characters in 2037 and the illustration of these scenarios by cartoonists. **Deliverables:** enriched scenarios and generative concepts rooted in the territory, and suggestions of possible action plans.	
Pre-project and projects	P	Some suggestions were made during the course of the codeign workshop. This pre-project stage would make it possible to propose a variety of projects that the Borough can propose in the coming years as a way to respond to the new issues identified at the outset. This phase produced a report outlining ten (10) possible paths to carry out the ideas generated. **Deliverable:** an action plan to transform the municipal organization	

Four 2037 briefs were proposed to planners with the municipal organization and to various stakeholders. Among the various formulated projectors revisiting the initial problems of the district (live, work, entertain, proximity (250 m)), two foresight scenarios were particularly full of unknowns.

- **Circular environments with positive energy:** This first scenario proposes dividing the borough into 26 sustainable living environments (or ecovillages) where citizens can engage in most of their activities: working, living, entertaining and shopping, and all within walking distance. These living environments generate "positive social energy" because the inhabitants would be encouraged to participate in the social life of the community through daily service. Two ways of living tend to collide. On the one hand, there is collaborative private housing (with grandparents, children, etc.) where one wants to stay in one's house for life. On the other hand, as access to housing has become expensive, "the micro-habitat" (as seen in Japan) becomes a solution for residents of 20

years in 2037. They live in intimate spaces small dimensions, basically intended for sleeping. They live their urban life out of their homes. In this scenario, people do several jobs in a day or a week and they participate through their productive "hobbies" in the production of goods and services: it is the era of multi-work-leisure. Entertainment is serious, residents want to become performing being, and games/competitions between communities are regularly organized. In addition, residents are invited to travel, staying in Rosemont, another village.

- **E-care zones with companion robots:** In this scenario, inhabitants live away from their "homes". During the day, they are separated from their loved ones because they work elsewhere, but with the help of the Internet of Things and companion robots, it is possible to provide support and care to loved ones remotely. The borough has set up 12 pilot "e-care zones" (screens, gardens equipped with the Internet of Things, "companion robots" that can be activated remotely, etc.) around places where their loved one are fragile or have less autonomy (schools, nursing homes). The habitat is individualized, digital (with home automation, controlled remotely) and the inhabitant can stay in this house, if possible, for life. To include all inhabitants in these accelerated technological changes, the borough has set up ongoing training for citizens ("robotic literacy") in public libraries. Permanent commercial entertainment dominates, and the robots are the good facilitators of "e-care" in public spaces. They are also companions who let inhabitants travel in their minds by telling them stories from around the world.

The participants were then invited to participate in a working group led by facilitators previously trained by the research team. Three activities were proposed to them:

- In the first exercise, participants were asked to present the elements of the scenario and comment on their interest (membership) or disinterest (dissent).
- The second exercise was aimed at enriching the triggering scenarios presented in the introduction. The participants were asked to imagine a logic of starting the scenario, through a day in the life of a family in 2037 (agenda, living experiences, work and entertainment).
- The last exercise, backcasting, was to develop possible strategies and routes for guiding between 2017 and 2037 the borough towards the desirable futures.

The approach was built by going in new directions, moving away from local or current problems. The proposals also ventured well beyond the confines of traditional planning tools. Ideas emerged for how to better integrate the activities of certain institutions into the urban fabric. In many respects, travel in the city was more understood as an activity unto itself, a source of fortuitous encounters, a constraint experienced with difficulty by citizens. Some concrete ideas were formulated:

- Recognize and value social involvement in living environments: most people contribute to their community by taking daily actions to help their fellow citizens. Inspired by the idea of the "Carbon Pass" and local currency proposals, this "Social Pass" draws on good actions taken by citizens in the neighborhood in terms of social and community investment. In exchange for good actions, points are accumulated, and could become marketable at the borough level since they contribute to its influence and to improving living conditions for the citizens. Value would be attributed to the points to motivate good actions.

- Consider the proliferation of "circular" third places; inspired by the concept of the circular economy as a principle of local economic development, circular third places could be developed to encourage the development of innovative entrepreneurial initiatives in every living environment (e.g. repair cafes, tool libraries, textile micro-enterprises and urban agriculture). Some of these circular economy activities could be grouped into third places of various sizes to allow for economies of scale and greater capacity for investment in specialized equipment (e.g. specialized Fab-Labs with 3D printing of spare parts, but also highly productive and sustainable urban farms). In addition, these third places registered in the urban area could be part of a network of specialized skills at the metropolitan level.
- Talk in terms of "movement in the city" and experiential mobility, rather than transport or displacement: following Amar (2010, 2015), the "speed-distance" paradigm, in which the journey between origin and destination is considered lost time, was discussed and criticized throughout the process. It was then picked up and supported by stakeholders during the codesign. The discussions often returned to the idea of promoting "time-substance", i.e. to take advantage of the fact that we are in movement in the city to fill our travel time with rich and varied moments of life (the pleasure of a walk, to meet with other people, to stop along a route to work or play). This idea recognizes the emergence of a population that seeks this connecting and experiential mobility, a form of everyday nomadism within the city. This drift is supported, even encouraged, by new technologies (and defines a way of thinking about "intelligent mobility"). This trend could bring vitality to the living environment (new passers-by creating surprises, an opening, meetings, bringing customers and users to the economic activities of communities). It could also cause tension in case of conflicts of use, a new form of NIMBY (e.g. ephemeral nomadic gatherings occur in a living environment at a late hour or on weekends).

4. **Discussion: tackling future urban issues from the perspective of a set of routines**

For the majority of municipal organizations, formulating creative ideas only focus on one step in the process, represented by phase "C". This is a much more complex activity. Innovative design in large organizations (the 4th quadrant of Figure 1) is more of a succession of phases that predispose planners to discovering a new set of routines. This new innovation process consists in turn of routines intertwined with each other, as represented by the DKCP steps. They must be well coordinated to avoid the pitfalls that would prevent discovery or cause participants to move into the other boxes too quickly.

The first routine is that of definition, “D”. This is a necessary first step in order to fully understand the opportunities available and imagine new spinoffs. It was at this stage that the team of researchers met with borough planners to identify various paths for exploring ideas.

The second routine is that of knowledge, "K". Disciplinary decompartmentalization is used to bring a diversity of knowledge and disciplines (engineering, health sciences, arts, agribusiness, etc.) into the process in order to re-imagine the identity of the planners' routines. This routine is also about identifying where a particular municipal organization lacks knowledge. More specifically, it involves seeing how other knowledge can help reopen the pockets of knowledge that have been identified. It is in this sense that the concept of mobility has been re-imagined in terms of temporality (promote the notion of time-substance (choosing which mode of transport to choose for a displacement of a certain duration) rather than of time-distance (250 m) (Amar, 2010)). The notion of ubiquity (being two places at the same time) also opened up great possibilities. Finally we find in this routine "K", the need to involve non-experts and to imagine the future users of the city.

The third routine is a design activity, “C”. This is a delicate and complex step. The urban planners were both surprised by the formulations of these scenarios and somewhat confused - they did not imagine being able to formulate them with *such* originality. Projector concepts must be formulated in terms sufficiently open to allow for the expansion of knowledge, and use relevant approaches for commmunication: scenario writing, maps representation, illustration in comics. In the Montreal project, imagining the "e-care zone" was a completely disruptive new idea to urban planners and citizens (although several participants disagreed with the scenario). Projectors concepts must also be described in understandable terms, failing which citizen participation will be ineffective. Moreover, the casting of the participants becomes a crucial question. The time required to complete a prospective territorial project requires participants setting aside their short-term expectations. So they must also be chosen according to their ability to "expand" the knowledge mobilized in the urban project, not only according to their representativeness.

These first three routines, D-K-C, also have a particular dimension specific to urban planning. Indeed, from the definition phase, there is a need to deterritorialize knowledge (Scherrer *et al.*, 2017). This does not suggests that we should ignore the spatial or technical constraints, but rather that we move away from them temporarily, to better explore the "field of breaks and possibilities" (Debarbieux, 2009, Klauser, 2012, Raffestin and Butler, 2012). Otherwise, when spatial constraints act as cognitive fixations (Hatchuel *et al.*, 2011), they limit expansive thinking. These ideas will later be recontextualized. In the case of the Rosemont project, this recontextualization step was an important step in the codesign project, but only occurred once the participants had responded to the initial scenarios.

The fourth step is therefore the routine of the propositions, “P”. This is possibly the most important, most underrated, forgotten and most complex step for urban planners. This is when we determine the actions to be taken and their sequence, in order to ensure that the most desirable scenario can be realized. This step of backcasting can, however, impede important changes that may occur along the way. In the Rosemont project, participants had a mandate to imagine a major and potential event in 10 years’ time that could require the reorientation of the scenario.

The last routine could be considered as a binding routine, since it turns out to be transversal to the process. It took the form of a seminar (several successive sessions, each time enhancing the knowledge generated earlier), during which the members of the project team built their own knowledge. They learned to let themselves get caught up in this search for the unknown, even if it raises doubts about the predictability of their methods. The fact of documenting this step, punctuated by disruptivity, in an iterative way, made them feel less destabilized.

Conclusion

Urban planning is a social science discipline in constant turmoil. This boiling point is driven by social and technological changes that now punctuate the activities of municipal organizations, and by the same token, those of their territorial planning teams. Municipal organizations and urban planning departments must therefore renew their methods and develop their organizational functions: will it be by the creation of municipal Innovation Labs ?

Since Weber, municipal organizations have often been encouraged to assimilate instruments and methods used in private companies into their processes (Lascoumes and Le Galès, 2004). This contributes to the interest in innovative design approaches used in the industry.

The example presented here is only an experiment established in a particular context. It has proven its usefulness in generating ideas that are at odds with the way urban planners approach urban planning. While the DKCP set of routines has proven its usefulness in regenerating urban planners' practices, it has yet to demonstrate the real ability

of urban planners to implement each of the steps. Routines for defining innovation fields are an easy process to implement. Establishing a routine interested in new knowledge. On the other hand, it is difficult to formulate projector concepts and so much for the transformation of disruptive scenarios inspired by these projector concepts into concrete projects.

Any municipal organization, unlike private companies, must demonstrate public accountability for the time and resources invested in innovation activities. The difficulty of taking risks, the rigidity of organizations, the difficulty of controlling long time, are all obstacles that must be overcome. The most effective way to act would be for a municipal organization, through its urban planners in particular, to promote innovative design approaches. Project P37 is a first step.

We must now move on to the next step. And dare to implement disruptive processes. And to accept that these projects are invaluable sources of learning to prepare for current and future urban challenges. In this way, it would be possible to design the innovative design of tomorrow's urban planning.

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