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Is the network challenged by the pragmatic turn in African cities?

Urban transition and hybrid delivery configurations

Sylvy Jaglin

What is a post-network city, and does this notion apply to the cities of sub-Saharan Africa? If the term means urbanised areas in which large sections of the built environment function, in the long term, without networks, then Africa's cities could be so described. This empirical observation has given rise to numerous studies, and prompted reflection on ways to remedy the situation (Banerjee et al. 2008; Banerjee and Morella 2011; Foster and Briceño-Garmendia 2010; Eberhard et al. 2011). The vast majority of existing studies analyse the situation as a failure of the networks, often seen as a consequence of backwardness: the network model remains both an ideal and a goal of public action, in which the focus is on overcoming the obstructing factors (decentralising, privatising, improving governance...). These studies are based on the assumption of urban convergence (Cohen, 1996), in which Africa's urban spaces are considered as representing different stages of the pre-network city. However, a recent branch of these studies has emphasised the fact that a variety of technological advances, combined with the growing decentralisation of urban management could – by bypassing the obstacles to the extension of the integrated network – help to improve access to essential services (Botton and Blanc 2014; Foster and Briceño-Garmendia 2010; Lighting Africa 2013), thereby raising the possibility of *off-network* cities.

However, this model of the relations between cities and networks raises numerous questions, particularly regarding the dynamics of change in urban services, their integration into Africa's particular forms of urban transition and their feedback effects on urban change itself. This chapter explores these questions by focusing on the reasons for and the nature of the recent interest expressed in academic and policy circles in the so-called informal service actors, who operate outside the perimeter of the conventional network operators (Ahlers et al. 2013; Botton and Blanc 2014; Katusiimeh et al. 2013; Naulet et al. 2014; Van Dijk et al. 2014). I try first to explain the timing of this new interest in an old phenomenon and why that interest has taken so long to emerge, and second to explore what it reveals about the interdependent transformations of infrastructures and African cities.

Network challenged by the turn in African cities?

Let us recall three key realities: across the continent, the privatisation of services to the benefit of big companies has failed to extend levels of coverage; informal service activities not only continue but are expanding; and a “wide range of contextualised solutions”, especially in the water sector (Lorrain and Poupeau 2014: 11) are meeting urban demand. Forty years after academic research and development institutions became aware of the informal dynamics of small-scale commercial production (Hugon 2014), twenty-five years after they became aware of their role in transport (Godard and Teurnier 1992; Pradeilles et al. 1991), urban services for water, sanitation, electricity and – a little in advance of the others – waste are now approached with the tools used for the analysis of the informal economy. This time lag is linked in particular with the natural monopoly characteristics of network services and with the legal monopoly framework in which they are organised: by making informal modes of service production illegal, this legal organisation has hindered the recognition of activities perceived as residual and destined to disappear with time. Recognition and attempts to formalise such activities thus reflect a profound change in perceptions. Indeed, including informal services implies acknowledging the plurality of demand and of supply options, and therefore accepting the exclusionary rather than universal nature of the network, leaving space for nonconventional operators in urban governance and giving up the (official) hegemonic power of the public authorities as sole rule setters. Recently, these changes have begun to find expression in policies – for example, in the redefinition of statistics on the populations served, in the greater diversity of actors involved in reforms and projects, and in the design of regulatory frameworks that include “second choice solutions [which] seemed to offer a happy compromise” (Foster and Briceño-Garmendia 2010: 98).

As yet, however, this movement would seem to represent more a catch-up reaction than a strategy to remodel the framework of action. I propose to call this movement a ‘pragmatic turn’ (PT) and to examine its causes, nature and consequences for Africa’s urban socio-technical regimes.¹ What does it tell us about ongoing infrastructural and urban change? In African contexts, governmental capacity to regulate is notoriously weak and therefore its capacity to influence, exploit or govern the informal sector is equally so. However, it is not zero. The aim is therefore to analyse the new forms of interaction between the state and informal actors involved in service delivery, and the shift in the power balance that ensues.² By contrast with the profusion of academic research on privatisations and the extension of new public management into the sphere of urban services, the PT has led to relatively low academic interest and theoretical effort so far, with an emphasis on three main areas: the analysis of infrastructural change through an extension of STS theories to the conditions and characteristics of developing cities (Furlong 2014); the conceptualisation of modes of service governance in contexts that are heterogeneous and normatively plural (Baron and Bonnassieux 2014); and the critical study of the role and nature of the “informal”, especially in water services (Ahlers et al. 2013; Ahlers et al. 2014; Botton and Blanc 2014). These studies offer a conceptualisation of ‘hybrid’ socio-technical systems, which bear different names – “delivery configurations” (Olivier de Sardan 2010), “modernised

Sylvy Jaglin

mixtures” (Letema et al. 2014), “co-production” (Ahlers et al. 2014) – but say little about the way their operation is shaped by local conditions of urbanisation.

Following the perspective adopted by a few other works (Ahlers et al. 2013; Jaglin and Zérah 2010; Lorrain and Poupeau 2014), the approach developed in this chapter abandons the focus on infrastructure (large integrated networks, mini-networks, autonomous systems). It re-territorialises the question of services by re-embedding, first, the network in the global supply of services and, second, the diverse delivery configurations in their social, material and spatial urban environment. In other words, the aim is to treat delivery configurations as urban assemblages made up of actors, technical objects, institutions, economic interests, social practices and representations, but also of material spaces, all interlinked and making it possible for a service to be provided in a given urban context. In this approach, the analysis of the “resistance of the milieu” (Dupuy 2011) to the deployment of the network gives way to a study of the relative position of the different components, of their individual working and the interactions between them, and of the overall functioning of the assemblages. The latter are not cut loose from the African urban context, but rather incorporate the features of that context: the socio-economic heterogeneity, which is increasing differences between luxury and necessary goods and services (Hugon 2014); the plurality of standards and rules (Chauveau et al. 2001), which is uncondusive to homogeneous frameworks for collective action; and the dynamics of socio-technical hybridisation, which is potentially more favourable to permanently heterogeneous assemblages than to processes of substitution between a current pre-network city and a (dreamed-of) post-network city.

In this respect, this article puts forward two hypotheses. The first is that the acknowledgement of an enduring hybridity of delivery configurations and its current incorporation into urban design thinking is a response to new urban socio-spatial dynamics: on the one hand, extensive and rapid expansion in the form of a heterogeneous urban-rural continuum rules out any hope of networks catching up in the medium term; on the other hand, the emergence of “middle classes”, though an imprecise and disputed category (Darbon and Toulabor 2014), has been associated since the 2000s with transformations in the demand for and consumption of urban services. The second hypothesis is that the formalisation of hybrid delivery configurations is an experimental method of regulating urban diversity in response to the socio-political tensions associated with this ongoing urban transition. The concept of regulation here refers to two overlapping dimensions of action: the sectoral regulation of services, i.e. the set of technical, economic, legal and organisational factors that govern their operation; and political regulation, understood as the set of mechanisms employed by public authorities to stabilise antagonisms and to ensure the reproduction of a social system (Jaglin 2007). The mode of regulation itself remains unstable and contingent, subject to multiple social and political tensions likely to affect its dynamics and its aims. For this reason, several repertoires of arrangement coexist, selectively picked by urban authorities, often in relation with outside players, donor agencies and NGOs. Nonetheless, with regard to the PT, they are invariably a response to two

Network challenged by the turn in African cities?

imperatives: reconciling service policies with macro-political frameworks drawn from the neoliberal arsenal, often in partial and truncated ways; and maintaining room for manoeuvre and resources that will give the dominant socio-economic classes a lifestyle and living conditions that match their expectations. Accordingly, formalising hybrid delivery configurations seems to be, in African cities, one of the manifestations of the neo-liberalisation of urban policies (Morange and Fol 2014) with new groups of winners and losers.

Drawing on recent research in Africanist urban geography and sociology on the one hand, and social studies of technology focusing on cities of the North on the other, the paper critically analyses the conditions of service provision in African cities by adapting the lenses of the literature on sociotechnical transitions to urban conditions in the South. It does not rely on a comprehensive case study, but combines my own research on urban services in several African cities with contributions from other recent empirical works. The argument is organised in three stages. The first part of the chapter defines hybrid delivery configurations by analysing the way in which they reflect the socio-spatial conditions of Africa's urban transition, and explains how they are changing under the PT. The second part explores the nature of the socio-technical changes triggered by the formalisation of hybrid delivery configurations, their capacity to transform urban infrastructures and the relevance of the analytical frameworks developed in the field of STS for the study of changes in large technical systems when it comes to African urban contexts. The third part explores the politics of formalising delivery configurations and shows that the PT is ultimately part of an attempt at the political regulation of urban heterogeneity, primarily through the tools of commodification.

From informality to the regul(ar)isation of hybrid delivery configurations

Improving the conditions of access to essential services in African cities remains a challenge, which the policies and projects implemented in recent decades have tackled with very limited success. The operators of conventional networks have not succeeded in providing services suited to the needs and resources of most city dwellers. Fewer than 40% of African urban households have running water at home, a septic tank or improved latrines, and in almost half of African countries scarcely 50% of city dwellers have access to electricity, whereas with demographic growth in urban areas, provision rates for all urban services (particularly drinking water) dropped between 1990 and 2005 (Foster and Briceño-Garmendia 2010: 126–127).

Having analysed elsewhere why the “modern infrastructural ideal” has proved unsuited to urban expansion in Africa (Jaglin 2005, 2014), I will focus here on the way in which hybrid delivery configurations correspond to the socio-spatial contexts of Africa's urban transition. Although diverse, sub-Saharan African cities have certain shared features: among the highest sustained demographic growth in the world (3.7% per year from 2000 to 2010), fragile and poorly equipped public institutions, the influence of colonial legacies and processes of

Sylvy Jaglin

institutional and cognitive transfer emblematic of “projected societies” (Darbon 2008), socio-economic inequalities and poverty that generate high levels of social frustration, an urban economy and production that are largely – sometimes primarily – informal, and rapid and diffuse spatial expansion that raises challenging problems of infrastructure and governance.

The range of essential services in these cities is today marked by three structural factors. First, in all sectors, demand is growing fast, even more so since urbanisation began to be accompanied by a consolidation of the middle classes, a significant proportion of whom live in the new suburbs. Next, access to resources and services remains rationed: this means that there is still latent unmet demand, which is both a source of economic opportunities, as evidenced by the interest and attraction of these new markets in a very dynamic demographic context (Damon 2014), and a factor of risk for urban authorities and, through them, for states. Finally, the political question of democratisation of access to urban resources (and of the right to the city) remains profoundly marked by a moral economy in which clientelism and patronage are disputed but relatively effective ways of sharing resources within societies with stark social disparities.

From networks to hybrid delivery configurations

In the mid twentieth century, the dominant configuration was a juxtaposition of a conventional network, in respect of which regulation was conceived, and a disparate collection of informal services. At best, the latter were tolerated and at worst they were opposed, with periods of alternation between the two in most cities. This configuration was first dominated by public actors and state-centred regulation, and then, from the 1990s, by reorganisations orchestrated within the framework of neoliberal reforms that favoured commodification, partnership contracts with private companies and the introduction of various forms of competition. The slow and circumscribed spread of these public-private partnerships has brought only very partial responses to urban demand, which remains partly dependent on public operators in various stages of modernisation, and, above all, on informal operators. The latter provide private commercial services, whether individual or collective, all of them illegal with respect to the official operators' exclusive contracts. Exploiting the diversity of demand and spending power, as well as of living conditions in highly heterogeneous urban societies, they offset the deficiencies of the conventional service and – depending on the type of urban area – target well-off customers dissatisfied with the official service or poor customers excluded because of lack of resources, physical distance from major infrastructure or illegal land occupancy (Jaglin 2014).

There are multiple examples in every sphere: water markets have been extensively described (see issue 7/1 of *Water Alternatives* 2014; Baron and Bonnassieux 2013; Botton and Blanc 2014; Jaglin 2005, 2013; Naulet et al. 2014), as have informal transport services (Godard 2002; Godard and Teurnier 1992; Lombard 2006; Pradeilles et al. 1991). Waste collection and recycling are also the focus of numerous studies (Ginisty 2014; Katusiimeh et al. 2013; Ngambi 2015;

Network challenged by the turn in African cities?

Sory 2013), while the integration of private sanitation solutions into value chains that ensure long-term funding is attracting growing attention (Trémolet and Evans 2010; Van Dijk et al. 2014). Less well-known, alternative energy services are a burgeoning field (Clément 2009; Franks and Prasad 2014; Gaunt et al. 2012; Lawaetz and Smyser 2010; Lighting Africa 2013; Smyser 2009), whereas the inventiveness of telecommunications and associated services is now well demonstrated (Cheneau-Loquay 2012). These arrangements are not infinite in number and variety and not all are found everywhere or with the same intensity. However, in all cities the provision of services relies on a combination of several of them, depending on the state and performance of the network, the dynamism of the small-scale private operators, the forms of urbanisation and the spending power of households. The technical and operational pluralism of delivery configurations is therefore the result of contingent co-construction processes, through which service functions are extended to end-users excluded from the conventional networked service. These are the hybrid configurations that the policies associated with what I call the PT seek to formalise, or even to encourage.

The dominant pattern of reorganisation of the waste service within the framework of “global schemes” planned and managed by municipalities thus reflects different mechanisms of cooperation between informal refuse collectors (at the households level), who sometimes also have recycling activities, a formal public service of collection (from public containers or transfer stations) and transport to final semi-controlled landfill centres, the management of which is increasingly outsourced to private subcontractors. Studies emphasise the fact that one of the challenges of this form of arrangement is to coordinate – across the whole chain – heterogeneous actors whose activity has in common neither practices and representations, nor technical knowledge and regulatory mechanisms, nor results (Katusiimeh et al. 2013; Ngambi 2015; Pierrat 2014; Sory 2013). In the sphere of water, where urban markets are highly diverse, different experiments are underway to find appropriate arrangements. Some choose contracting out to private operators, acting as wholesalers, i.e. simultaneously “major customers” of the conventional operator and “retailers” for the general population (Botton and Blanc 2014: 112); others seek to regulate small-scale independent providers (Ahlers et al. 2013; Botton and Blanc 2014; Valfrey-Visser et al. 2006) or mini-networks whose management is assigned to user associations (Naulet and Biteete 2014). In sanitation, research is still in its infancy and is looking to identify segments of the activity where public action could be effective (Trémolet and Evans 2010). Studying sanitation management in two informal districts in Dar es-Salaam and Kampala, Van Dijk et al. identify three functional segments – latrine construction, maintenance and emptying – and suggest that the main obstacles to the development of a satisfactory service could be removed by a pragmatic policy recognising existing private solutions, enhancing government support in terms of technical development and training for small-scale local contractors and designing appropriate financing mechanisms (Van Dijk et al. 2014).

In all these examples, small-scale informal private operators are seen as players in service markets: “Increasingly, policy perspectives are moving away from

Sylvy Jaglin

seeing hybrid forms of service delivery governance as dysfunctional, and instead seeing them pragmatically as ‘arrangements that work’” (Ahlers et al. 2014: 10). The aim of formalisation policies is to regulate their activities and coordinate them with those of the conventional operator, in particular through new forms of institutional contracting out or micro-partnership arrangements. By making urban service markets more secure, and even if this entails institutional and socio-technical bricolage (Criqui 2015), these policies open up the markets to new providers and reassure middle-class customers, who are more demanding about service quality and reliability.

New socio-spatial dynamics of service demand: emergence of the middle classes and urban sprawl

Hybrid delivery configurations have generally been associated with service to poor city dwellers, but they need to be seen more broadly in relation to the socio-economic and spatial dynamics of demand which are also influenced by a recent dual trend: the rise of the urban middle classes, and African-style urban sprawl.

Vague and open to dispute, the notion of the middle class is at the heart of the debate in African cities, where the emergence of new, rising social formations has been empirically observed (Darbon and Toulabor 2014). This category encompasses millions of urbanites with daily earnings typically ranging between US\$ 2 and US\$ 20 per person, who share two characteristics: having escaped from poverty through a capacity to generate a surplus; but facing the persistence of a form of vulnerability (Darbon 2014). More precisely, Africa’s middle classes encompass three disparate subcategories: the global middle classes (US\$ 10 to US\$ 20 per day), with substantial revenues and significant assets; the stabilised middle classes (US\$ 4 to US\$ 10 per day), who have escaped from poverty but lack sufficient assets to be sure of maintaining their social position from one generation to the next; and the floating class (US\$ 2 to US\$ 4 per day), who have disposable income but remain at risk of downward social mobility (Darbon 2014).

These populations have spending power, although in varying proportions, and aspire to consume, particularly commercial urban services which consolidate their new social position. One of the problems is how this demand can be satisfied. Indeed, while the notion of the mathematical “averaging” (Damon 2014) of revenues has the advantage of highlighting a continent-wide dynamic, it in no way indicates uniformity of behaviours and values, since statistical aggregation masks very different national dynamics and local situations. More a code name than a concept (Darbon 2014), the notion of a middle class is nevertheless a way of drawing attention to a dual connection between urban social change and service consumption practices. First, these middle classes “invent themselves” in terms of their own self-representations and their social advancement, in which desires and norms of consumption are important and, in particular, place value on individualised access. Next, the prices of these services and the way they are sold (in units and in the form of split purchases) directly contribute to the fulfilment of these middle-class aspirations: by providing services that are more “affordable”

Network challenged by the turn in African cities?

(although not less expensive), these forms of commercialisation contribute to the improvement in living standards which, generally speaking, owes much to the goods and services produced by the informal economy, as well as to the large-scale arrival on the markets and in day-to-day life of low-cost technologies (and goods) from China and India (Darbon 2014). The PT proceeds from a political acknowledgement of the fact that hybrid delivery configurations contribute to the 'invention' of the middle classes, by trivialising access to services, and to their 'self-realisation', by selling the services in a form that makes them affordable.

These new urban markets are to a large extent located at the suburban interfaces, where land and real estate development activity today is intense. Sub-Saharan urban Africa is not exempt from the propensity of the city to dissolve into the urban, identified several decades ago in industrialised countries, where it is associated with post-Fordist economic changes. In a very different economic context, African urbanisation also produces distended, discontinuous and heterogeneous built spaces, well described for example in Guinean West Africa (Dorier-Apprill and Domingo 2004; Héraud-Arouna 2005). Densely populated, this huge cross-border regional area is characterised by a very high level of commercial and migratory exchanges, intense land speculation generating transformations that are clearly visible in the landscape, physical and economic urbanisation (new activities targeting new markets) driven by a spectacular increase in mobilities, and sociocultural changes revealed in the diversification of practices, ways of life and representations. Stretching along the coast from Abidjan to Lagos, this "African-style urban sprawl" is caused less by demographic growth than by a redistribution of residential function in a region well provided with roads and tracks covered by a particularly efficient network of informal transport operators, open trucks and *zémidjan* (moto-taxis).

This steadily spreading urban expansion, variously described as a "multi-polarised conurbation" (Dorier-Apprill and Domingo 2004), African-style *desakota* (Calas 2007; 2013) or suburbanisation (Buire, 2014), is accompanied by declining densities, which further raise per capita infrastructure costs. According to the calculation by Foster and Briceño-Garmendia, in big cities in Africa, those with populations of more than 3 million and an average density of 5000 people per square kilometre, water and sanitation represent the highest share of infrastructure (54%), followed by roads (28%), electricity (17%) and ICT (1%) (Foster and Briceño-Garmendia 2010: 129). When population density is low, particularly on the edges of cities, the cost of building infrastructure becomes prohibitive and experts agree on the need to think of alternative, cheaper technologies, such as solar panels, boreholes or in situ sanitation. However, the problem is not so much to do with employing these technologies as with embedding them in appropriate and durable socio-technical systems, especially as these areas are usually located outside the scope of coverage of the conventional operator, or indeed of an urban public authority. For this reason, delivery configurations in these areas take different operational forms depending on the resources available to real estate developers and occupants, ranging from rich, super-equipped, autonomous enclaves to vast areas characterised by informal solutions (Allen 2014).

Sylvy Jaglin

The PT is thus a response to urban transition, in its socio-economic (demand for services among emerging middle classes), spatial (periurbanisation, urban sprawl, encroachment into farmland) and political dimensions. The last of these is crucial: much more than the very poor city dwellers locked in day-to-day survival strategies, and the well-off or rich households whose spending power and mobility allow them to find satisfaction on globalised markets, it is the middle-class sections of society which today are the main social force demanding public action. Their requirements in terms of quality of life and domestic comfort are not fully satisfied by the available commercial types of supply, while their lifestyles and aspirations prompt them to reject the mutual support and DIY solutions from which they are trying to escape. Since the conventional operators are unable to respond to these urban demands, which cannot be met simply through service differentiation (Jaglin 2008), formalising hybrid delivery configurations is another attempt to answer urban heterogeneity.

Before returning to this political dimension in the third section, I will now explore the link between the PT and a possible transition in African urban socio-technical regimes.

From formalisation to infrastructural transition in African cities?

The essential services studied here are produced by means of socio-technical systems that combine technical artefacts, sociopolitical organisations and expertise, but also practices and representations. Some of them depend on a capital intensive material infrastructure network, others on networks of actors and scattered technologies that require little capital. Taken together in relation to delivery configurations, however, these socio-technical assemblages share no infrastructure, in the sense employed by Star and Ruhleder (1996),³ and do not have the capacity to form strong communities of practice. My view here is that the purpose of the experiments in formalising hybrid delivery configurations is to bring such an infrastructure and community of practices into existence.

In that case, can they be analysed as together constituting a major technological transformation in the way in which the essential functions of urban metabolism are performed in African cities? In other words, can the formalisation of hybrid delivery configurations be considered as both the driver and the outcome of an infrastructural transition, and if so, a transition to what? In order to explore these questions, I draw on a handful of works at the intersection between urban studies and STS, which examine the urban dimensions of infrastructural transitions (Bulkeley et al. 2014; Monstadt 2009; Monstadt and Wolff 2015; Rutherford and Coutard 2014). Employing the concept of socio-technical regimes, defined as “relatively stable configurations of institutions, techniques and artefacts, as well as rules, practices and networks that determine the ‘normal’ development and use of technologies” (Smith et al. 2005: 1493), they seek to understand “the ways in which the dynamics of infrastructure systems are configured by and through urban places” (Bulkeley et al. 2014: 1473). Examining the conditions and modes of change, the resistances and political games they give rise to, they

Network challenged by the turn in African cities?

analyse when and how the destabilisation of an urban socio-technical regime triggers a transition.

Apart from the fact that the theoretical frameworks of these studies, which are primarily “derived from circumstances in the North”, cannot be immediately transposed to cities in the South (Furlong 2014), their perspective differs somewhat from my own, which is not so much to question the conditions of change and how it is managed than to examine the nature of the transformations under the PT: does it drive a transition from one urban socio-technical regime to another?

Let us begin with three observations inspired by the analysis of socio-technical transitions (Furlong 2014; Geels 2002). First, the processes observed relate less to a movement of transformation than to attempts to formalise and coordinate the disparate components that make up the particular assemblages which, in each city, constitute a delivery configuration: the change comes not from the destabilisation of an established system, but from an attempt to consolidate what is already there. Next, the changes examined arise less from processes of innovation as such than from a series of incremental adaptations that facilitate the – relative and unequal – functional inclusion of actors and practices long partitioned in sealed socio-technical worlds.⁴ As Furlong points out, these modest changes “involve integration as opposed to innovation” (Furlong 2014: 145). Finally, while many initiatives initially take the form of a “niche experiment”, they in no way claim to be in “opposition to dominant values and practices” (Bulkeley et al. 2014: 1474). On the contrary, numerous studies show that, in Africa (Kjellèn and McGranahan 2006; Ginisty 2014) and elsewhere in the South (Criqui, 2015), the conventional – integrated – network model is less challenged by these initiatives than consolidated by a socio-technical bricolage, which seeks to address its deficiencies, and by regulatory adjustments which help to stabilise hybrid delivery configurations. In order to reconcile the conceptual frameworks of socio-technical studies with the conditions that prevail in cities of the South, Furlong observes that a stable socio-technical system can remain enduringly hybrid, and that the transition does not need to culminate in a process of substitution, but rather may bring with it diversification and heterogeneity (Furlong, 2014). However, is this process still a transition?

Empirical observation shows that the changes target certain components of hybrid delivery configurations without disrupting them, and that their occurrence is discontinuous and scattered, not affecting the conventional network’s subsystem. Thus, the spread of low-cost Chinese technologies and products on African markets has transformed certain segments of supply on the water markets: in Maputo in the 1990s, it facilitated the emergence of small-scale private operators who developed mini-networks; in Douala, by reducing costs, it caused a proliferation of privately financed boreholes and a reorganisation of the urban water markets. The example of electric batteries, photovoltaic panels, low-cost electricity meters, polyethylene water tanks and pipes, but also entry-range and second-hand mobile phones, testifies to the successful introduction of low-cost technologies that ease the pressure on the network rather than disrupt its regime. Incremental change, through the adoption of compensatory practices – e.g. the

Sylvy Jaglin

gradual proliferation of individual water storage tanks, generators (long-standing in Nigeria) or solar water heaters (recent in South Africa) – works in the same direction: by mitigating the recurrent dysfunctions of the networks, it makes their failings acceptable.

Considered at the level of delivery configurations, change above all highlights growing technical inequalities between the various channels of supply and the complexity of their interactions. On the one hand, network infrastructures have high inertia and lack flexibility in the face of urban growth and sprawl; on the other hand, they retain an astonishing power of attraction, recapturing territories when investment is available and pushing out informal activities. This explains why the components of the same hybrid delivery configuration often show differentiated dynamics of evolution, particularly in the presence of outside actors who promote different models and target distinct parts of the assemblage. Maputo provides an example (Ginisty 2014). There, the water service underwent an in-depth reorganisation, the most visible aspect of which affected the network operator, which was split into a public asset-holding company (FIPAG) and a private company (AdeM) which was granted an operating licence for the service in the *Cidade*. However, in addition to this central socio-technical nucleus, there were two further water supply subsystems. First, there were some 300 hydrants, “confiscated” more than managed by committees, which users rejected in favour of buying water from individuals (Ginisty 2014: 196); second, there was a market of around 450 small-scale private providers delivering underground water through standpipes and household connections to ‘spaghetti’ networks. The delivery configuration therefore comprised at least three components, and its formalisation since the mid-2000s has entailed the organisation and professionalisation of small-scale private operators, the coordination of all the services, but also the scripting of methods for the negotiated eviction of the small-scale operators wherever the network reaches (Blanc et al. 2009; Botton and Blanc 2014). By choosing the small-scale operators rather than the hydrants, residents confirmed their acceptance of the commodification of water and more generally of commercial urban practices. However, the households surveyed by Ginisty also stressed their preference for the conventional model of the network, the epitome of “successful” city dweller status, for which they make or have made significant financial efforts (Ginisty 2014).

Is this a case where the transition “is less about innovation and more about integration into the physical as well as the Latourian network” (Furlong 2014: 144). or where the very idea of transition should simply be abandoned? My analysis suggests that informal services are rarely an alternative solution, completely emancipated from the network; it also suggests that emerging local initiatives try to orchestrate partial and reversible changes in delivery configurations in cities that are themselves undergoing rapid metamorphoses – not to begin a move away from the network as a socio-technical regime, but, on the contrary, to maintain its existence, even if confined to a few exclusive urban showcases. What is at stake is much less the transformation and substitution of socio-technical regimes, than the way in which they coexist and co-evolve. Rather than transition,

Network challenged by the turn in African cities?

the central question relates to the conditions of emergence of an “effective” coordination between heterogeneous worlds. Indeed, as hybrid delivery configurations bring together material infrastructures, immaterial frameworks (cognitive, procedural, normative, symbolic) and lastingly separate communities of agents, it is crucial to understand whether, and how, some form of coordination can produce a valid and functional arrangement between these heterogeneous worlds (Star and Ruhleder 1996). That is the full challenge of the formalisation attempts under the PT.

The Pragmatic Turn: commercial regulations in heterogeneous urban environments

In order to address urban heterogeneity current initiatives rely on commodification and extension of the service markets, but they are rarely equipped to identify and correct the environmental and social externalities (on the difficulties of sectoral regulation, see Jaglin 2014). Initially intended to bring about a short-term political readjustment in terms of access to resources and amenities, geared to the socio-economic metamorphoses of the urban transition, these initiatives are indifferent to urban environmental “sustainability” and their regressive social effects receive no more consideration.

It is undoubtedly a difficult exercise since, while bringing integration and better living conditions to certain urban areas, the formalisation of hybrid delivery configurations also raises issues of social inequalities and environmental consequences in circumstances that are not conducive to the expression of objections, for reasons that relate to political legacy (for example, in Mozambique; Ginisty 2014), or to the characteristics of the emerging middle classes. Apart from their membership of essentially horizontal social networks, these classes are characterised, according to Darbon (2014), by a strong individualism linked to the demanding pursuit of upward social mobility and to a conformism marked by limited interventions in the public sphere. Sometimes associated with a “post-political” urban condition (Choplin 2014), this attitude is nevertheless in no way an expression of apathy; rather, it reveals the concentration of energies on individual advancement through the maintenance of activities and revenues that are always under threat. In this respect, Darbon notes that the middle classes are exposed to a fourfold pressure: economic (against insecurity); psychological (for self-discipline); social (the breaking of old social bonds); and normative (to adopt the rules and standards of the wealthy classes). However, political pressure is absent (Darbon 2014). Their lack of involvement in and control of the public sphere, together with their relative aversion to collective action, explains the rarity of collective mobilisation by the African middle classes, but this low level of political engagement should not be interpreted as a lack of interest in the state. Indeed, so-called ‘middle-class’ groups are concealed behind state power, which enables them through action or inaction to pursue their efforts for advancement (Darbon 2014). In other words, the potential anti-establishment political force of the emerging middle classes, slated to rise with the urban transition and as a result

Sylvy Jaglin

of electoral factors that reinforce the influence of urban social constituencies, is today neutralised and in a sense diverted into a massive and astonishingly creative engagement with all sorts of urban activities, in particular informal ones. Against this backdrop, formalising hybrid delivery configurations appears as a way for African state authorities to negotiate the urban transition: a partial regularisation of the informal sector facilitates the provision of essential services, in exchange for a civil order that also benefits the urban elites and dominant classes.

Regulating urban services or governing the informal?

The fact that the formalisation of hybrid delivery configurations constitutes an appropriate response to urban demands does not mean that it is free of problems, as noted by Ahlers et al. – “embracing the informal in the form of hybrid arrangements is no shortcut to progress” (Ahlers et al. 2014: 10). Indeed, as a political regulation process, the PT is at present sorely lacking in technical and economic expertise and tools to tackle externalities (environmental, sanitary, social). In the absence of economies of scale, informal services are often costly for floating class households, for whom the level of effort required to keep up payments may ultimately prove unsustainable; without appropriate methods of control and technical regulation, the quality and continuity of services are both uneven and variable; markets are unable to maintain societal and territorial solidarity, raising the spectre of urban fragmentation; and finally, informal private actors take no account of environmental externalities, which leads to the risk of overexploitation of the commons to the detriment of wider ecological balances. These failings are not resolved by a formalisation limited to the granting of a form of recognition, but nor are they a structurally inevitable result of the hybrid nature of the configurations or the presence of primarily informal actors within them. In reality, very different results are observed depending on how and by whom the arrangements are politically managed. Two examples provide an illustration.

In Ouagadougou, twenty years after the Sankarist political compromise of “shared urban management” (Jaglin 1995), under which land ownership was regularised in exchange for the (economic and human) engagement of city dwellers whose weariness was beginning to be apparent in the early 1990s, the introduction at the beginning of the 2010s of a policy to contract out the water supply service to small-scale operators in five peripheral areas of the city constituted a paradigm shift. It is now the commercial service, in a modified but classic example of outsourcing operations to small-scale private operators under contract with the ONEA (national water and sanitation office), which is responsible for meeting the needs of more than 86,000 suburbanites (Botton and Blanc 2014). The operating profits recorded by at least four of the five operators, none of them with previous experience in the water sector, are no doubt evidence of their management skill, but also of the social change underway in these districts: consumption remains modest but is on the rise, with households acquiring not just individual connections but also showers and toilets. This configuration, in which the service delivered by small-scale private operators is ‘regular’ and ‘solicited’,

Network challenged by the turn in African cities?

reflects a deliberate policy by the main operator to extend its activity to the edges of the conventional network, without losing control over the public water service: by relying on small-scale operators under contract, it marginalises other access alternatives (in particular street selling of water from hydrants), and maintains relative homogeneity in service principles (water quality, pricing), while the technical specifications and shortness of the contract (five years) maintain the prospect of future reintegration into the conventional network.

In Maputo, small-scale independent informal producers operate in an apparently competitive market (Blanc et al. 2009) and their activity, often cited as evidence of the informal sector's capacity to replace the failing public service, is the subject of an original experiment in formalisation (Botton and Blanc 2014). Ahlers et al. (2013) nevertheless criticise "the myth of 'healthy' competition" which underpins this policy and the presuppositions associated with it. The sharp inequalities in size and economic power existing between the operators contradict the idea of an "open" market, and, as in the conventional water sector, "the combination of sunk costs and economies of density leads to monopoly-like characteristics" (ibid.: 181). Furthermore, market deficiencies are exacerbated by the regulations (on prices, conditions of entry to the market and of spatial expansion of the mini-networks) enforced by the two operator associations, which impose cartel practices that serve their interests as producers, in particular the biggest ones, rather than those of users. In other words, "[w]hat is hailed as 'free entry' to the market, or 'healthy' competition, is in reality a power play determined by economically unequal actors, locationally determined social relations, and historic uneven development, resulting in uneven service provision" (Ahlers et al. 2013: 181).

The cartelisation of water services (Jaglin and Bousquet 2012), deals between informal waste collectors (Sory 2013), or the corporatism of the informal taxi syndicates (Pradeilles et al. 1991; Wilkinson 2010) all attest to the limitations of imperfect competition on informal markets. These limitations affect not only the regulation of the conditions under which users access the service, but also working relations within production units, competition between unequal producers, and to an even greater degree the extent of negative externalities (overexploitation of groundwater, uncontrolled evacuation of waste into urban interstices, street congestion...). A recent study on informal waste collectors in Kampala emphasises the contrast between their collection service, much appreciated by households, and their complete environmental inefficiency (Katusiimeh et al. 2013). Another study, on the sale of water from private boreholes in Nairobi, also shows the limitations of the service in terms of social equity and resource protection (Chakava et al. 2014). For example, the poor spend 6% to 30% of their monthly income to buy water that does not meet the WHO's drinkability criteria at a price ten times higher than that paid by wealthy households for the first block of the mains water tariff. Moreover, surveys show that the overexploitation of underground water, which is poorly and ineffectively managed and monitored, is leading to a rapid lowering of the water table in certain districts. The authors nevertheless conclude that this solution is probably the "least bad" of the strategies of access to water for the many poor households in the Kenyan capital city who

Sylvy Jaglin

receive little or no pipe water provision, and the only one that ensures a continuous supply of sufficient quantities, in particular during the recurrent droughts.

The formalisation of delivery configurations thus follows very different outlines: whereas in Burkina Faso the state initiates, controls and regulates, in Mozambique the government hands over the “policing” of the water market to a “shadow regulator” which cares more about the interests of the big producers than of the public (Ahlers et al. 2013), while in Nairobi the sectoral authorities turn a blind eye. How should these differences be interpreted? The questions raised by hybrid delivery configurations and their formalisation are neither about the private status of the operators nor, intrinsically, about the informal nature of their activities. They point to the character of public regulation, the political intentions that underlie it, and the capacity for action of the authorities responsible for its implementation. The selectiveness and unequal aspirations of the formalisation policies apparent in African cities reflect the way political powers perceive their opportunities in relation to the tensions generated by the urban transition and to the robustness of their political alliances: as a result of new modes of managing the relations between formal and informal within hybrid delivery configurations, the PT is one expression among others of the way in which the authorities seek to manage and regulate urban change.

Toward a political economy of hybrid delivery configurations

The production of cities where rapid demographic and spatial growth is taking place, which are marked by sharp socio-economic inequalities, against a background of persistent destitution in numerous urban areas still devoid of basic services and infrastructures, raises significant challenges in terms of regulation.

Part of contemporary African urban realities, often considered as evidence of the return to growth and of improvement in economic conditions, is expressed through urban policies that reflect a revival of “modernist” visions and projects. These take the form of a proliferation of strategic plans, leading Watson to wonder whether they represent the dreams of the continent’s inhabitants or embody the return of the worst nightmares of planning (Watson 2014). For Myers, they represent above all “a return to faith in elitist, modernist visions for metropolitan development wildly at odds with what grassroots organizations say, think, or plan for in these cities’ majority areas” (Myers 2014: 16). After first documenting these disparities through a rapid overview of projects in a handful of African capitals, he goes on to dissect them in detail in his analysis of the *Nairobi Metro 2030* plan, whose central message – “Nairobi is open for business” – is unmistakable, consonant as it is with the precepts of entrepreneurial urban planning and the vocabulary of neoliberal globalisation (Myers 2014: 10). While the terms environment, sustainability and inclusion are also present, “this appears to be a form of green-washing the document, since minimal space is devoted to actually planning for waste management, water resources, or genuine means of inclusivity” (ibid.), while the informal neighbourhoods and their catastrophic lack of services are virtually absent from the content of the Plan. Allen emphasises a similar

Network challenged by the turn in African cities?

tension when examining “the peri-urbanization of differential sustainability”: through the production of eco-enclaves, like the vast luxury Airport Hills estate in Accra, the peri-urban interfaces are today simultaneously one of the primary locations of and a mine of resources for an urban transition which is both desirable and exclusionary; they are part of a twofold current involving the spread of an eco-environmental culture that reflects the aspirations of the urban middle classes and the dispossession/displacement of populations marginalised by the consumption of space and resources by these emerging classes (Allen 2014). She suggests that “[f]rom this perspective, the peri-urban interface can be apprehended as a laboratory where interventions to regulate the urban metabolization of nature might selectively safeguard certain environmental resources or services while consolidating unjust patterns in the distribution of positive and negative environmental externalities” (Allen 2014: 524).

Although different in its forms, this discriminatory urban planning, with its production of socio-spatial inequalities, is not new. However, its context is novel, because large neglected or coveted city areas are now heavily populated by city dwellers, escapees from poverty ready to pay for improved services, courted by local political leaders seeking social constituencies in local electoral contests. A laissez-faire approach, abandoning the urbanisation of these new middle classes territories to informal actors alone, is therefore no longer always an economic and political option. By drawing on the now well-mastered repertoire of neoliberal urban policies – formalisation of property rules and rights, extension of the market regulations, promotion of entrepreneurial principles and competition – the formal acknowledgement of hybrid delivery configurations creates the conditions for a transfer of resources, risks and opportunities between groups of city dwellers, consumers and producers, while reasserting state control over certain informal activities in return for legal and political protection. In so doing, it not only satisfies the existing small-scale operators, but makes their activities more attractive for new entrepreneurs, who may potentially be closer to the authorities as is illustrated by the emblematic case of Douala (Nantchop, in press).

The urban transition constitutes a scale shift in the dynamics of urbanisation and brings profound social changes, as well as sharp competition for space and resources. A crucial challenge for urban policies and the primary objective of local governments is to regulate these contradictory processes and to devise solutions that can resolve them in a context dominated, since the 1980s, by so-called neoliberal policies that consist, like the land policies inspired by Hernando De Soto, in regularising the informal. The PT is one of the manifestations of this political programme for integration *by* the market.

Conclusion

Let us return to the original question: are African cities post-network cities? I have shown that the network model exists within hybrid delivery configurations, and is not undermined by their formalisation: re-embedded in the material and social environment of cities, made more functional by low-cost extensions or

Sylvy Jaglin

off-network devices, the model seems both to be consolidated within limited perimeters and subject to long-term competition outside these perimeters. In these circumstances, the formalisation of delivery configurations of essential services should be understood as a process of regularisation similar to those affecting numerous other aspects of the urban economy: land markets, informal trading, etc. It is encouraged or tacitly accepted by states, but is located in the overlap between the strategies of many other actors: local urban entrepreneurs, multinational utility firms, upwardly mobile households... It is facilitated by adaptations (technical, commercial, institutional) and financially assisted by development institutions and NGOs that also provide support, experience and expertise which capitalise and channel the projects. Finally, it is founded first on principles of combination and hybridisation between heterogeneous socio-technical systems, and second on a ‘normalisation’ of commercial practices that span the previously separate categories of public service and informal markets, because the challenge for governments is both to promote integration via the market and to control the conditions of that integration.

So while it plays an active part in the political regulation of the urban transition, the PT does not for the moment seem to be contributing to a profound transformation in urban socio-technical regimes in Africa. Enacting ‘differential production’ of services within the framework of formalised hybrid delivery configurations could nevertheless constitute the basis for a third generation of reform in network services (after the modernisation-decentralisation and then the privatisation of public utilities). The real innovation here lies less in the way this reform combines public and private actors, commercial and public service principles and a degree of user involvement in governance, than in the fact that it imports the principle of heterogeneity into the operational sphere, by incorporating informal activities and the quest for a grammar of coordination between the distinct socio-technical subsystems of a given delivery configuration.

Hence, while the network may not be ‘soluble’ in the PT, its hegemony may be. This is not a minor change, and its benefits, in terms of extended service provision and support for the emergence/consolidation of the new urban middle classes, should not be underestimated. In general terms, however, whether the formalisation of hybrid delivery configurations contributes to the creation of a city that is more equitable in terms of access to public services and more sustainable in terms of environmental protection is a question that remains open. The recognition of informal actors in fact says nothing about the identity of the beneficiaries of these policies, about their links with urban and national authorities, about the profits and revenues they can hope to obtain. Likewise, the expansion of informal urban service provision, the conditions of its coexistence with other forms of provision (public and private, community-based) or the likelihood of its driving out other modes of access to resources – for example, free resources – can vary greatly. Ultimately, the regularisation of informal operators is less a goal than a transactional tool for the liberalisation of the markets of essential services and for their extension to emerging middle-class populations previously disqualified by the exclusionary paradigm pursued by the conventional operators: neither its

Network challenged by the turn in African cities?

robustness as a method of regulating the heterogeneity of urban societies, nor its capacity to ensure the trickle-down of social progress beyond the big gainers from the urban transition, are certain. They will need to be tested and assessed over time.

Notes

- 1 This notion comes from recent studies which, at the interface between social studies of technology and research on cities in the North, have suggested and discussed the idea of a distinct ‘urban socio-technical regime’ (Bulkeley et al. 2014; Hodson and Marvin 2010; Monstadt and Wolff 2015).
- 2 Although African conditions are very different from those studied by Schoon and Altrock in China, we drew on their concept of “conceded informality” and the way in which it can be used to analyse “a flexible management of diverse informal practices depending on their relevance, usefulness and potential threat towards state authority” (Schoon and Altrock 2014: 216). Through five strategies, described as “modes of governing ‘the informal’”, the authors show how the state reconciles two necessities: finding practical and effective solutions to rapid urban and economic changes; and managing the transition from a dominant state-party to a state-party that is seeking legitimacy and forms of cooperation with non-state actors in governing the cities.
- 3 According to Star and Ruhleder: “Infrastructure is a fundamentally relational concept. It becomes infrastructure in relation to organized practices” (1996: 113), and “infrastructure occurs when the tension between local and global is resolved. That is, an infrastructure occurs when local practices are afforded by a larger-scale technology, which can then be used in a natural, ready-to-hand fashion” (1996: 114). It is then precisely about cooperative activities through the frontiers of heterogeneous worlds.
- 4 At least within the official frameworks of sectoral policies and the official exercise of professional practices. By contrast, a number of studies have emphasised that “Sunday plumbers” and electricity “poachers” share their time between formal work in service companies and informal, on-request bricolage, thus establishing a bridge between these two worlds which long precedes its incorporation into policy.

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Sylvy Jaglin

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