

Mechanisms of Risk Production in Modern Cities

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ABSTRACT

Historically, risk assessment and the concept of risk itself have been dominated by environmental, engineering, and economic sciences. Consequently, in analyzing risk production in modern cities, a rather technical view emerges on risks and urban dynamics. Though scientifically grounded and practically useful, this view fails to capture the social complexity of the city, its paradoxes and causalities. Elaborating on the hypothesis that the life-supporting mechanisms in modern cities are simultaneously life-endangering mechanisms, the article aims to develop a sociological framework to comprehend the dynamics of systematic risk production in the urban milieu. Methodologically, to illustrate the functioning of such mechanisms, we will use historical references and several empirical analyses related to urban research.

KEYWORDS

interdisciplinary risk research, risk, social complexity, systems theory, urban research



Introduction

In a classical view, cities are conceived of as spaces providing all conditions necessary for our physical and social existence. Perhaps the most salient approach pointing in this direction was the description by Aristotle ([384–322 AD] 2009) of the polis as a self-sufficient territorial unity where all human potentialities could be deployed and realized. This unity of the city has been a recurring topic in political philosophy—as seen in the metaphorical depiction of the perfect city as a *City of God* by Saint Augustine ([426 AD] 1998), or the city of *Utopia* by Thomas Morus ([1516] 2002), or the reinterpretation of the city as a republic in itself by Machiavelli (1882), and the conceptions of urban life as the desired representation of civilization and progress in the nineteenth century (Sarmiento 1972). The city seemed to be inextricably linked to the emergence of the unity of social—especially political—life.





Modern sociology has also reflected this point in terms of differentiation processes. Max Weber (1978), for example, understood cities predominantly as territorial market settlements (market centers) generally supported and protected by political power. Georg Simmel (1950) identified the metropolis as an always changing environment of multiple and fragmentary social stimuli, which at the same time entails radical changes in consciousness and individuality. In a similar vein, Talcott Parsons (1982: 304) categorized urban communities as “generalized ‘centers’ of higher-order activity” such as economic, political-administrative, religious, and cultural functions. And modern systems theory has interpreted cities as a dense space of opportunities for the “multi-inclusion” of human beings into different functional spheres, while exclusion, in multiple forms, is the inevitable counterpart (Nassehi 2002). Cities became a unity of differences, in a nutshell, a place and space of social complexity.¹

Cities have gained a functional primacy because they centralize and condense economic or political opportunities and serve as economic hubs for worldwide economic trade, while the hinterland becomes more and more irrelevant (Castells 1996: 436). The concentration of expertise, capital, and contacts are part of a global network. The particular rationalities of functional systems appear to free themselves increasingly from local ties, on the one hand, but are also dependent on cities, which now serve in specific business quarters as “grounding” of such processes (Marcuse 2006: 207). Therefore, cities are both spaces of opportunities and risk: on the one hand, they constitute social spheres where risk taking is an intrinsic feature of social systems, and, on the other hand, they generate problems if risk taking is embedded in the vital functions of the cities’ reproduction. The term “systematic risk production” marks the distinction between systemic operating conditions (codes, media, programs, structures) and structures that make it necessary to take risks. Social systems are not determined, but are historically and analytically indeterminable, and establish degrees of freedom that they can and must make use of. These degrees of freedom are inevitably connected with selection, contingency, uncertainty, and risk. “Systematic” accordingly designates a *modus operandi*: to seek, compel, normalize, and absorb risk (Luhmann 1993: 71). The production of risk is a constituent of system reproduction, and is therefore not a special case that has to be avoided.²

The aim of this article is to explore whether behind the multiple social, natural, and technical processes we can identify a structure of systematic risk production that endangers the very systems that hold

the city together. Expressed in terms—and this is our hypothesis—the life-supporting mechanisms in modern cities are simultaneously life endangering. Consequently, we will present an analytic framework within which we can observe the operation of risk mechanisms and their continuous interplay.

In order to draw out the main points of this argument, we present a brief sociological reflection on the concept of risk and its internal relation to differentiation and social complexity by referring to a theory of society in the vein of Luhmann's work. On the grounds of this discussion, we propose an analytic framework of four dimensions within which the mechanisms of systematic risk production can be identified—attraction/exposure in a spatial dimension, metabolization/deterioration in a factual dimension, synchronization/desynchronization in a temporal dimension, and inclusion/exclusion in a social dimension. In order to illustrate the continuous interplay between these mechanisms, we relate them to some main issues observed in risk research in modern cities. We will analyze the interactions between attraction and exposure, especially in relation to their consequences for the mechanisms of inclusion/exclusion and synchronization/desynchronization in the fields of natural disasters and informal networks. Finally, we conclude by summarizing the consequences of the interplay of the basic mechanisms in modern cities.

The Sociological Contours of Risk in Modern Society

The concept of risk is a product of modernity. Historically, a prenotation of risk can be traced back to insurance regulations in Roman law, under the economic question of who has to bear the costs in the event of casualties during transport of public money, corn, and other commercial products. Formulas such as *periculo* (danger) and *damno* (damage) are the conceptual expressions of an ancient concept of risk (Vance 1908; Holdsworth 1917). As such, the concept appeared in early insurance contracts—especially in maritime trade—as a precaution against possible financial loss (Conze 2004: 848). Since then, the concept has gradually expanded into multiple fields, where its appearance made it possible to reflect on the functional differentiation of modern society. It has led to a growing awareness of the risks the functional domains of society have begun to generate themselves.³

These seminal works on risk hint at the basic argument of all contemporary research on modern society, especially those concerned



with risk and danger as the main issue: the gradual shift of awareness from *exogenous* hazards toward *endogenous* threats in the form of individual and organized decision making (Beck 1986; Luhmann 1993). With the development of rational organization and the deployment of efficient technology, society increasingly deteriorates its own natural environment, which has severe repercussions for society itself.⁴ Therefore, the central theme of today's theorists is the notion of self-endangerment as a consequence of social action. Obviously, the overall dilemma is that all decisions entail uncertain consequences, even the decision not to decide or decisions with the intention to reduce harm. The propositions of Ulrich Beck (2007) on the substitution of established institutions (subpolitics) and of Anthony Giddens (2009: 116–117) on an institutional reform (climate change politics monitoring body) also bear consequences of unknown scale.

In general terms, if the myriad decisions in politics, economics, law, or science are responsible for the development of modern society and all technology in use, then risk taking is the “normal mode”, and safety, as a desirable state of affairs, cannot be achieved. What we find nowadays is the constellation of risk taking on the one hand—like political reform, financial speculation, dangerous scientific experiments, and institutional constraints in terms of political incrementalism—and of more or less rigid regulation oscillating between risk aversion and risk mitigation on the other (Japp 2000). This relationship of mutual amplification is not the result of some careful consideration and planned implementation, but rather a result of social evolution. It is neither linked to an intended goal, nor is it free of conflict. On the contrary, this development has led to the fundamental breach in society between decision makers and those affected by the decisions, in which the majority almost never participates. “*The real dangers in modern society are the decisions of others,*” claims Luhmann, and those dangers “cannot be avoided because others are everywhere” (Luhmann 1990: 226; emphasis in the original).

The idea of risk as a universal trait is based on sociological work emphasizing the importance of social mechanisms in dealing with uncertainty in a functional sense. The focus is on fundamental structures that neither possess the capacity nor the function to eradicate risks, but that have to cope with their consequences in an increasingly complex world. For example, legislative and regulative procedures aim to reduce the exposure to hazards resulting from others' decisions, but also, and foremost, they establish sustainable expectations in terms of the consequences of one's own actions and the actions

of others (Luhmann 1993: 59). Or, as another example, (impersonal) trust and confidence reduces uncertainty to an extent that enables action and decision making in nontransparent situations, but also gives way to abuse and new societal perils (Shapiro 1987; Strulik 2007). In this sense, risk is an engine of social dynamics. The function of the concept of risk is to reintroduce the incommensurable complexity of the future into the present and to transform it into different forms of absorbed uncertainty, that is, the limitation of all possible future states and outcomes of decision making. Risk thus becomes the difference between expectable (limited) states in the future and the unexpected (unlimited) states caused by the interference of simultaneous occurring, unknown events. Risk is the modern consciousness of complexity, a borderline between the world as we know it and other possible—not always desirable—states.⁵

In order to analyze the dynamics of modern cities from a sociological point of view, we distinguish three analytically distinct aspects of the concept of risk: in the factual dimension the relationship between system and environment, in the temporal dimension the relationship between present and future, and in the social dimension the relationship between sources of decision and affected systems (Luhmann 1993; Japp 1996):⁶

1. In a factual dimension, the unavoidable fact of complexity in modern social life (multiple systems and environments) requires selectivity as its fundamental operation, and selectivity is instantiated by means of committing to different courses of action. Risk becomes the distinction between potentiality (eventual damages) and actuality (occurrence of unforeseeable events).
2. When committing to a course of action, a difference between the present and the uncertain future opens up and, thus, a temporal dimension. The risk of a possible future damage—that could not have come about if another course of action had been selected—is the consequence of a present decision. Yet, consequences are impossible to know in the present. Selection is blind. Decision makers look for support in various methods of risk assessment,⁷ but they (we) cannot avoid the circular complexity of the future of then-evolving events, triggered by the very same decisions (Strulik 2007: 243–244).
3. In a social dimension, decisions introduce the difference between the deciding system (persons, organizations, procedures, institutions, systems in general) and those whom the decision

will eventually affect. As long as the latter are excluded from the sources and procedures of decision, they are not “taking risks”; they are, on the contrary, exposed to the dangers of others’ decisions (Luhmann 1993).

With these analytic distinctions in hand, we like to discuss the thesis that the life-supporting mechanisms of cities are simultaneously life endangering. In this sense, we try to identify *mechanisms of systematic risk production* as entangled features in the dynamics of megaurbanization processes.

Four Basic Dimensions for the Analysis of Risk in Modern Cities

From the beginning, cities are inevitably linked to a territory: “the first thing necessary thereunto is a common place of habitation, namely the city, which must be one, and this every citizen must have a share in” (Aristotle 2009: 1261a). It is of course true that modernity has brought about a disembedding (deterritorialization) of social processes (Giddens 1990), which leads to the reproduction of practices without reference to the territorial place where they are instantiated. We can even speak of *global cities* as new social units that replace the national state as an actor in the international arena (Sassen 2001; Krause and Petro 2003). But the question is, what are the conditions of the possibility of these practices, and how do they affect the continuation of their own operation?

One of these conditions is *territory*: “Cities would be then ... places within which different social events become simultaneously ‘visible’ and in doing so they extend a synchronic space that becomes the city space” (Nassehi 2002: 218). Cities do not simply contain social relations; rather, the territory is the open scenario for performing social relations (Schroer 2006). In that sense, cities make visible what society cares for (economy, politics, religion, art, education, health, sports), but precisely this visibility exerts a gravitational pull causing spatial densification that may endanger the carrying capacity of urban institutions, procedures, systems, and natural resources. Baecker (2004: 266) identifies here a mechanism of city dynamics, inasmuch as the extension of a city pulsates with its increasing and decreasing attractiveness. Cities win and lose with this attraction. In the first case, they may gain in economic activity or political influence (positive

feedback); in the second case, they may suffer from demographic explosion, insufficient jobs, or economic stagnation (negative feedback). Yet, as long as economic activity, political influence, educational opportunities, and health care concentrate in the cities, moving out of cities is not a likely strategy to deal with risks and danger. Cities thus become poles of *attraction* that simultaneously *expose* those attracted (the city's dwellers) to the spatial scenario, and in doing so, they expose themselves to deleterious consequences. We can speak here of a mechanism of risk production in the *spatial dimension* organized around the distinction *attraction/exposure*.

Modernization theories played with this distinction in the 1950s with regard to the problem of urbanization and its psychosocial consequences (see Germani 1973). Today, the problem is no longer—at least not primarily—the migration of rural masses from the countryside to urban areas and the contradiction of their traditional/modern attitudes, but the systemic densification of cities, namely, its transformation into complex nodes of modernity.

A second condition of cities is *operation*. Modern cities are not allowed to take a break. They are 24-hour cities (Bianchini 1992). Through procedures and sociotechnical systems, they are constantly metabolizing inputs to produce different outputs. Simmel was one of the first sociologists to pay attention to this factual functioning of the cities and its independence of individuals as particular functional and interchangeable units (Simmel 2004: 301). In this sense, cities are operational units in which functional roles, services, and objective relationships among individuals—the “matter-of-fact attitude” in Simmel’s terms—are realized (Simmel 1950: 412). They can be seen as processor units, especially under an economic rationality, that absorb environmental resources to sustain functions, services, and relationships that do not recreate the metabolized resources and, worse than that, deteriorate them with pollution, neglect, defective sustainability plans, and inefficient procedures of systemic coordination. We speak here of a *factual dimension* of risk production structured by the distinction *metabolization/deterioration*. Environmental theories and theories of political ecology usually apply this distinction (see Heynen et al. 2006), but they regularly observe this problem either as a purely technical transfer of energy or from a normative perspective (livability, sustainability) that moralizes the factual operation of cities. We aim to observe this rather in terms of the dynamics indicated by this distinction: deterioration is the reflexive value of metabolization, as a reminder of the tipping point of dangerous processes.

A third condition of cities is *temporal synchronization*. Again, Simmel is a good starting point:

the technique of metropolitan life is unimaginable without the most punctual integration of all activities and mutual interrelations into a stable and impersonal time schedule Punctuality, calculability, exactness are forced upon life by the complexity and extension of metropolitan existence. (1950: 413)

If the fundamental problem of city life is complexity and not rationality, time can be conceived of as a system-relative distinction between before and after (Luhmann 2005). Temporal synchronization as a condition of modern cities means that every sociotechnical (not natural) system creates its own temporality by distinguishing between before and after. The fleeting moment of the present is a decision aiming to reduce complexity and thus inevitably producing risks. Then, if every system creates its own temporality, it has also its own instruments for measuring time: the time of economy is measured in the oscillation of prices, the time of politics in the oscillation of public opinion, the time of science in the oscillation of publications and criticism. As Urry points out:

In premodern societies lived time is inscribed into space as in a tree trunk and like a tree trunk shows the mark of those years that it has taken to grow, while in modern societies time is absorbed into the city such that lived time is invisible or reduced to its methods of measurement. (2009: 185)

Hence, with different measuring instruments, the problem of coordination among urban structures becomes crucial.

Contrary to the common understanding, cities are immanently *polytemporal*. They must fight themselves to defeat the improbability of their own synchronization. Plans, timetables, guidelines, strategies, policies, regulations, protocols are the social instruments aiming to transform the immanent desynchronization into polytemporal synchronization. What Simmel observes—punctuality, calculability, exactness—is the consequence of the success of such instruments in coordinating polytemporal social systems, but that is not a permanent condition of the city. Much more, cities are permanently confronted with the oscillation between *synchronization/desynchronization* in a *temporal dimension*. Probabilistic and deterministic engineering analyses on urban services have tangentially dealt with this distinction (Gunderson and Holling 2002), but they usually consider time as a property of the world. Our problem is more radical than that: there are multiple temporalities in the city when we have different modes of dealing with time.

The fourth and last condition of the possibility of cities is *communication*. This may sound like a rather obvious statement. Yet, it is not trivial when we assume that communication is the form in which society resolves the problem of double contingency (Luhmann 1995). Double contingency means that for each event that occurs in society, communication has to cope with at least two interrelated systemic structures (formally alter and ego) that simultaneously construct their own representations of space (spatial dimension) and time (temporal dimension) through their own operations (factual dimension). The city is not only a polytemporal milieu in modernity, but also a polycontextual one. That means, in principle, that in urban activity systems reject each other; a centrifugal (entropic) dynamic prevails as a consequence of their reciprocally excluding interactions. Socially, we could say, systems are set up in a form of mutual exclusion. There is a continuity of exclusion that should be processed in order to transform it into inclusion. The carrier of that transformation is communication.

Communication can either succeed or not. If it succeeds, individuals are considered as persons included in functional systems, that is, they participate in their outputs and services. Persons become relevant to systemic communication. If it fails, then individuals remain as individuals in the systemic environment, that is, they cannot take part in their outputs and services (Luhmann 1997: 76). Urban plans, housing, transport, and service policies (health, education, technical services, social security, police surveillance) become then a crucial factor for the spatial, factual, and temporal distribution of possibilities of communication with(in) systems. The organization of the city is a medium that can either improve or obstruct communication, thus affecting the conditions of inclusion/exclusion of the citizens. This introduces a new factor of risk that may have deleterious consequences for the whole society.

The worst imaginable scenario might be that the society of the next century will have to accept the metacode of inclusion/exclusion. And this would mean that some human beings will be persons and others only individuals; that some are included into function systems for (successful or unsuccessful) careers and others are excluded from these systems, remaining bodies that try to survive the next day. (Luhmann 1997: 76)

We recognize here the fourth mechanism of risk production: the oscillation of *inclusion/exclusion* in a *social dimension*. With regard to the urban problematic, theories of sociospatial differentiation have reflected this issue extensively.⁸ Yet, their main concern is how to explain territorial differences on the basis of the concentration of money and

power, thus separating inclusion from exclusion almost ontologically. Perhaps complementarily, by proposing the mechanism of inclusion/exclusion, we aim to observe the complex interactions between inclusion and exclusion at an urban level—mainly, inclusive exclusion, compensated exclusion, and “subinclusion” (Mascareño 2011).

Although analytically we can distinguish these four mechanisms and dimensions of risk production, they certainly show mutual repercussions in urban interactions. This is precisely what we want to explore and illustrate now with reference to urban research.

The Mechanisms of Risk Production at Work

In his already classic book *All That Is Solid Melts into Air*, Marshall Berman (1988) clearly illustrates how the distinction of attraction/exposure becomes an underlying mechanism in the construction of the modern city. Berman calls this the “modernism of underdevelopment”—a mix of an obscene but attractive exposure of inclusion (the nobility) and exclusion (the poor artisans, prostitutes, derelicts, and bohemians). In modernization theories, this mix was examined using two psychosocial concepts: the *demonstration* and the *fusion effect* (Germani 1971: 122ff.). The former is an outcome of the dynamics of attraction/exposure as it expresses the inclination toward modern attitudes and expectations that fill up the urban scenario; the latter results from an attempt to integrate inclusion and exclusion as it combines modern with traditional traits. And for those who are disappointed in their expectations and fail to integrate into the city spaces, modernization theories have developed the paradox concept of marginalization (Germani 1981), which on the one hand indicates that people are *beyond* the social margins of inclusion and, on the other hand, that they play a role *in* the city dynamics—at least, as subjects of state coercion, that is, as “subincluded” persons.

In our terms, and following our hypothesis, marginalization would be the socially most dramatic outcome of a self-endangering attraction to the urban space—attraction to the point where the different mechanisms of metabolization of the city (social and technical) can no longer deal with social demands and reach a point of deterioration that transforms risk in imminent danger and probable catastrophes, especially for those who are either included in the exclusion—as subjects of discrimination—or subincluded (historically, the marginalized “Lumpenproletariat” of Marx [1869: 49]). In contemporary city re-

search, the topics of natural disasters and informal networks may illustrate this point.

Natural Hazards

Natural disasters do not exist solely as exogenous factors—disasters are always endogenous to the social. This statement could summarize the sociocentric perspective on risk in this context. In natural disasters research (where probabilistic and deterministic approaches are combined with a governance-oriented focus), this perspective is captured by the difference between exposure and vulnerability. Exposure refers to the inhabited spaces regularly affected by natural forces (earthquakes, extreme temperatures, droughts, floods, landslides, volcanoes, wildfires), while vulnerability expresses the organizational and technical capacity of dealing with the social consequences of these forces. Accordingly, “natural disasters” are more likely to affect underdeveloped zones of the world, where procedures, regulations, and sociotechnical structures reduce the thresholds for transforming risk into danger and catastrophes. The most vulnerable zones in the world are cities in developing Asia—particularly Southeast Asia—large parts of Africa, and Latin America—particularly Central America (Morrow 1999; Small and Naumann 2001; Dilley 2006; Lall and Deichmann 2012; Julca 2012).⁹

Suitably, Julca (2012) puts forward the concept of *inequality of natural hazards* to address this point. This would not only mean that vulnerability in developing zones is higher than in developed ones, but also that the “multiple effects of natural hazards undermine even further the adaptive capacities of poor countries and areas affected, widening their gaps with rich countries and weakening the livelihoods of the people in these areas” (ibid.: 509). The lack of basic infrastructure in these zones endangers their inhabitants and this, in turn, reduces the effects of public responses, because governments are only administering catastrophes.

This inequality may also be reproduced inside the city: “Housing prices reflect this risk with the poorest living in the lowest quality housing in the most at-risk areas. In cities such as Caracas or Rio de Janeiro, poor families occupy steeply sloped land prone to landslides” (Lall and Deichmann 2012: 3). In order to counteract this, the authors argue for a better hazard management and maintenance of infrastructural systems, market-based risk reduction, and more credible information on hazard risks in cities. The problem with this argument is that

in most of these areas there are no systems to maintain, market-based decisions are responsible for that neglect, and more information about risks has marginal effects on risk behavior. Something similar can be said for lower-income households in the Andean piedmont region in Santiago, which are exposed mainly to floods and landslides (Banzhaf et al. 2011: 141), for large cities in India such as Bangalore and Chennai, where floods regularly affect low-income zones (Gupta and Nair 2011), for small settlements in the periphery of Morelia, Mexico, which are exposed to annual floods (Hernández-Guerrero et al. 2012), or for informal settlements in Guatemala City's metropolitan area, where there are no sociotechnical systems to process the consequences of earthquakes, landslides, floods, and hurricanes (Miles et al. 2011).

Informal Networks

Informal networks illustrate a similar problem but from another point of view. When there is no institutional framework to deal with social demands, or when the existing mechanisms cannot absorb such demands by taking the necessary measures to solve the problems in a proper and acceptable way, then it cannot be expected that persons abandon their expectations of inclusion. Consequently, an informal structure of inclusion emerges beside the formal institutional framework of the city. Deffner addresses this point through the concept of *geography of inequality*, a form of radical sociospatial differentiation of large Brazilian cities with the favelas as self-governing spaces: "As a *ville illégale dans la ville légale*¹⁰, the *favela* represents another form of city, a parallel world with its own logic within Brazilian cities" (2010: 119). Since the consolidation of drug networks and organized crime in the *favelas* in the 1980s and 1990s, police and state agencies have disappeared from the scene (Deffner 2011), which means that basic services are no longer operational, security and protection is in the hand of a "parallel power," and the universal principle of equality before the law does not apply in the favelas' world anymore (Deffner 2007: 215).

Cities are attractive, yet their attractiveness may exceed their ability to assimilate demands and to synchronize them with the formal-institutional procedures of inclusion. From then on, the cities' dynamics construct nonplaces, not in the sense of disembedded spaces of globalized social interaction (Augé 2000), but as subincluded areas of sociality in which the dangers of full exclusion are replaced by

dangerous inclusions into informal networks and reciprocity chains. The mechanism of inclusion/exclusion becomes a paradox—it must recreate forms of inclusion in the exclusion (dealing with drugs, armaments, protection of criminals) that may only count as subinclusion (marginalization). Informal networks thus appear as an alternative channel to achieve what was denied in institutional frameworks. But at the same time, this exposes the “noncitizens” to life and death decisions that increase the risk to an incommensurable level (Deffner 2007: 112). In conditions of subinclusion, personal risk management becomes a permanent matter of life or death.

A similar but more entangled situation is the network of politicians, police forces, and criminal organizations in Buenos Aires. As in the case of favelas, city attraction means also attraction for illegal activities. Especially in clientelistic political systems, the construction of illegal exchange systems may be understood as a condition for the viability of the state: everyone must receive “something else” in order to accomplish formal functions (Gambetta 2009). In Buenos Aires, police forces are closely linked to political parties in what Dewey (2011) calls a *reciprocity pact*. On the one hand, politicians ask for a reasonable level of crime in the streets and offer noninterference in police organizations and protection of certain officers, and on the other, police offer legal and illegal protection and use this noninterference for improving their finances through other reciprocity pacts with criminal organizations in the market of stolen cars and drugs: police sell protection to criminals by arresting criminals and releasing them after payments, by selling information to criminal organizations, and by releasing some city areas from police supervision (subincluded nonplaces) for money (Dewey 2011: 23ff.).

We can speak here of a self-stabilizing and excluding synchronization of three worlds: politicians, police, and criminals. Self-stabilizing because the pact with one side sustains the pact with the other, and excluding because the synchronicity shall persist as long as it remains invisible to the environment and no other agents join the network. This also reveals the multiple layers of risk existing in this situation. It is a matter that cannot be comprehended by probabilistic modeling or psychological risk perceptions, since none of these actors are what they appear to be—except for the criminals, perhaps. If risk depends on decisions, the synchronized decisions relating politicians, policemen, and criminals in Buenos Aires to each other are, for the public, subject to a double uncertainty—the uncertainty of the decision itself and the uncertainty whether these actors perform the formal or the in-

formal role as they communicate. This double uncertainty exposes the whole public of the city to dangers that are produced and reproduced behind a veil of formality, so that the normal bureaucratic procedure appears to be the origin of damage and not precisely its abrogation.

Actual risk management in the case of favelas in Brazil and criminal networks in Buenos Aires (police and communitarian intervention, political disclosure, enforcement of law) would mean to run more risk with unknown consequences than the dangers already known and managed by nonintervention. At least these risks have become integrated into the formal political and economic calculations. On the other hand, because of the immanent invisibility and elasticity (loose coupling) of such networks, they can re-emerge after each intervention, or—worse than that—they can co-opt the interveners and increase their influence and stability. Informal networks seem to be the response to the failure of different mechanisms of risk management in modern cities and in modern democracies. This may be the reason why the best way to reduce their influence is to increase the harmonization between attraction, metabolization, synchronization, and inclusion of formal institutions of modernity.

Conclusion

The illustrated interplay of multiple mechanisms has several consequences with regard to the production of risk.

1. Risks get into a scaling dynamic and multiply ad infinitum, because one decision becomes dependent on multiple other decisions at local, translocal, regional, and global levels. Each decision presupposes other completely unknown decisions—as in the case of financial decisions (Silvia 2011)—and they are made in a systematic manner: risk and opportunity are two sides of the medal.
2. Those who do not participate in decision making are exposed to invisible dangers against which they have no chance at all, precisely because they cannot influence the “root causes” and “dynamic pressure” determining their existence (Wisner et al. 2004).
3. Problems of desynchronization are experienced on a regular basis at local and translocal levels—as in the case of traffic jams, blackouts, or computer failures (Heinrichs et al. 2011).

4. As an integrated consequence of cumulative decisions, exposure to unknown dangers, and desynchronization, both sources of decision and potentially affected persons must deal with the contradictory expectation of “normal accidents” (Perrow 1984).
5. These polycontextural dependencies of risks create avalanches of causalities when important decisions are indefinitely postponed. This produces extended catastrophes on multiple levels against which reactions are only possible after hitting the bottom—as in the case of financial crises (Teubner 2010).

There is, also, a need to discuss how virtuous cycles of metabolization (sustainability, livability) and attraction to global cities (concentration of social opportunities) interact with problems of deterioration, desynchronization, and inclusion/exclusion. Virtuous cycles, particularly in global cities—attractiveness for money, global connections, political influence, cosmopolitan lifestyles, cultural integration, and aesthetical preferences—entail incommensurable risks not only for those cities, but also for secondary zones of the global stage. Additionally, a relevant part of the inequality in the effects of natural disasters and of the institutional fragility in regions of Latin America, Africa, and Asia are a complex (dark) consequence of such virtuous cycles in global cities. Risks have no nationality, and autarkic strategies such as, “Jump from the world!” have proved to be unsustainable, precisely for economic and political reasons.¹¹ It can also be argued that global cities are in a better position to assess and manage their risks, that the concentration of knowledge, knowledge workers, money, and political decisions certainly produces acceleration in problems, but also innovative solutions and responsiveness.

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Notes

1. Complexity refers to the function of the number of elements of a system, the relative differentiation or variety of these elements, and the degree of interdependence among these elements (La Porte 1975: 6). For complex systems, the consequence is that the constituting elements cannot be related to any other at any time (Ashby 1958). They cannot be considered as a unity of tightly coupled components in which movements can be programmed.

2. We can refer here to the discussion about uncertainty, ignorance, and non-knowledge as a resource for social action *as risk taking*. On ignorance as “room to move” and its utility and benefit in general, see Smithson (1993). This is especially valid for the financial system, but also for politics, science, or health care, for example.

3. In the sixteenth century, Michel de Montaigne (1968) used it as a reflexive concept for possible dangers in coping with new technical devices (namely, coaches) and persons. After that, the concept was applied in the fields of natural forces (Robinson 1714), experiments with animals (Herissant and Stack 1751), calculations of payments depending on survivorship (Price 1770), and increasingly in medicine and medical responsibility (Currie and Percival 1792; Anonymous 1846), economic matters (Sprague 1866; Hawley 1893; Haynes 1895), war affairs (Harvard Law Review Association 1920), education (Horn 1923), finance (Hardy 1923), and administration (Douglas 1929), among others.

4. The latest example of the Tohoku earthquake in Japan in 2011 has shown to what extent high-risk technologies have been exposed, through decision making, to dangerous natural hazards. As in the case of the subsequent Fukushima nuclear power plant accident, such decisions can lead in extreme circumstances not only to the loss of lives and goods, but can also render whole regions inhabitable (Khazai et al. 2011).

5. In modern risk research, the reduction of complexity of future events (namely, forecasting) has become the object of different disciplines. For an overview, see Bedford and Cooke (2001), Brillinger (2003), Schneider and Mastrandrea (2005), Eeckhoudt et al. (2011), Aven (2011).

6. With regard to urban research, we will include a fourth dimension, namely, space.

7. Here, especially the relationship of science and decision in regard to risk and danger is of interest. We can distinguish several concepts for investigating the potential for the realization of unwanted, negative consequences of events: classic frequentist approaches (see Rowe 1977); experimental approaches determining dose-response relationships (NRC 2009); Bayesian approaches using expert judgments to draw inference from uncertainty, probability, and utility (see, for this discussion, Lindley 2000), and even post-Bayesian approaches, which advocate using uncertainty standards in decision making, such as an urn, to achieve a common understanding between experts and decision makers about probabilistic statements regarding hazardous events (Aven and Reniers 2013).

8. See, for example, Weiher (1991), Boyser (2009), and Pacione (2009).

9. See also the Global Risk Information Platform (www.gripweb.org; accessed 16 November 2012), an initiative of the United Nations Development Programme (UNDP), to follow the argument of particularly disaster-prone regions in the world.

10. Deffner cites this expression from Licia Valladares (2009: 64).

11. The failure of the so-called strategy of import substitution industrialization in Latin America in the second half of the twentieth century is probably the best example for that (Fajnzylber 1983). The economic reforms in the former Soviet Union and in China in the 1990s are also illustrative examples (Hough 2001; Chai and Roy 2006).

References

- Anonymous. 1846. "Editorial Report." *Provincial Medical & Surgical Journal* 10 (19): 217–218.
- Aristotle. (384–322 AD) 2009. *Politics*. New York: E. P. Dutton (translated by William Ellis).
- Ashby, W. Ross. 1958. "Requisite Variety and Its Implications for the Control of Complex Systems." *Cybernetica* 1 (2): 83–99.
- Augé, Marc. 2000. *Non-places: Introduction to an Anthropology of Supermodernity*. London: Verso.
- Augustine, Saint Aurelius. (426 AD) 1998. *The City of God against the Pagans*. Cambridge: Cambridge University Press.
- Aven, Terje. 2011. "A Risk Concept Applicable for both Probabilistic and Non-probabilistic Perspectives." *Safety Science* 49: 1080–1086.
- Aven, Terje, and Genserik Reniers. 2013. "How to Define and Interpret a Probability in a Risk and Safety Setting." *Safety Science* 51 (1) (January): 223–231.
- Baecker, Dirk. 2004. "Miteinander Leben, Ohne Sich Zu Kennen: Die Ökologie Der Stadt." *Soziale Systeme* 10 (2): 257–272.
- Banzhaf, Ellen, Annegret Kindler, Annemarie Müller, Karin Metz, Sonia Reyes-Paecke, and Ulrike Weiland. 2011. "Land-Use Change, Risk and Land-Use Management." In *Risk Habitat Megacity*, ed. Dirk Heinrichs, Kerstin Krellenberg, Bernd Hansjürgens, and Francisco Martínez, pp. 127–154. Berlin and Heidelberg: Springer.
- Beck, Ulrich. 1986. *Risikogesellschaft: Auf dem Weg in eine andere Moderne*. Frankfurt am Main: Suhrkamp.
- Beck, Ulrich. 2007. *Weltrisikogesellschaft: Auf Der Suche nach Der Verlorenen Sicherheit*. Frankfurt: Suhrkamp.
- Bedford, Tim, and Roger Cooke. 2001. *Probabilistic Risk Analysis: Foundations and Methods*. Cambridge: Cambridge University Press.
- Berman, Marshal. 1988. *All That Is Solid Melts into Air: The Experience of Modernity*. New York: Verso.
- Bianchini, F. 1992. "The 24-Hour City." *Demos Quarterly* 5: 47–48.
- Boyser, Katrien De. 2009. *Between the Social and the Spatial: Exploring the Multiple Dimensions of Poverty and Social Exclusion*. Farnham, UK, and Burlington, VT: Ashgate.
- Brillinger, David R. 2003. "Three Environmental Probabilistic Risk Problems." *Statistical Science* 18 (4): 412–421.
- Castells, Manuel. 1996. *The Rise of the Network Society—The Information Age: Society, Economy, and Culture*. Cambridge, MA: Blackwell.

- Chai, Joseph C. H., and Kartik C. Roy. 2006. *Economic Reform in China and India: Development Experience in a Comparative Perspective*. Cheltenham, UK: Edward Elgar.
- Conze, Werner. 2004. "Sicherheit, Schutz." In *Geschichtliche Grundbegriffe: Historisches Lexikon Zur Politisch-sozialen Sprache in Deutschland—Band 5*, ed. Otto Brunner, Werner Conze, and Reinhart Koselleck, pp. 831–862. Studienausgabe 1. Stuttgart: Klett-Cotta.
- Currie, James, and Thomas Percival. 1792. "An Account of the Remarkable Effects of a Shipwreck on the Mariners; With Experiments and Observations on the Influence of Immersion in Fresh and Salt Water, Hot and Cold, on the Powers of the Living Body. By James Currie, of Liverpool, M. D. Fellow of the Royal College of Physicians at Edinburgh. Communicated by Thomas Percival, M. D. F. R. S." *Philosophical Transactions of the Royal Society of London* 82: 199–224.
- Deffner, Veronika. 2007. "Soziale Verwundbarkeit Im 'Risikoraum Favela': Eine Analyse Des Sozialen Raumes Auf Der Grundlage Von Bourdieus 'Theorie Der Praxis'." In *Risiko und Vulnerabilität in Lateinamerika*, ed. Rainer Wehrhahn, pp. 207–232. Kieler Geographische Schriften 117. Kiel: Selbstverlag des Geographischen Instituts der Universität Kiel.
- Deffner, Veronika. 2010. "Geografia da Desigualdade Social: Uma Perspectiva de Geografia Urbana Crítica Apresentada a Partir do Exemplo da Produção Social da Favela em Salvador-BÁ." *GeoTextos* 6 (2): 115–137.
- Deffner, Veronika. 2011. "Second Class Citizens." *D+C International Journal* 38 (3): 110–112.
- Dewey, Matías. 2011. "Fragile States, Robust Structures: Illegal Police Protection in Buenos Aires." *SSRN eLibrary*. <http://ideas.repec.org/p/gig/wpaper/169.html> (accessed 21 February 2013).
- Dilley, Maxx. 2006. "Setting Priorities: Global Patterns of Disaster Risk." *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* 364 (1845): 2217–2229.
- Douglas, William O. 1929. "Vicarious Liability and Administration of Risk I." *Yale Law Journal* 38 (5): 584–604.
- Eeckhoudt, Louis, Christian Gollier, and Harris Schlesinger. 2011. *Economic and Financial Decisions under Risk*. Princeton, NJ: Princeton University Press.
- Fajnzylber, Fernando. 1983. *La industrialización trunca de América Latina*. Mexico City: Nueva Imagen.
- Gambetta, Diego. 2009. *Codes of the Underworld: How Criminals Communicate*. Princeton, NJ: Princeton University Press.
- Germani, Gino. 1971. *Política y sociedad en una época de transición; de la sociedad tradicional a la sociedad de masas*. Buenos Aires: Paidós.
- Germani, Gino. 1973. *Modernization, Urbanization, and the Urban Crisis*. Boston: Little, Brown.
- Germani, Gino. 1981. *The Sociology of Modernization: Studies on Its Historical and Theoretical Aspects with Special Regard to the Latin American Case*. New Brunswick, NJ: Transaction Books.
- Giddens, Anthony. 1990. *The Consequences of Modernity*. Cambridge: Polity Press.
- Giddens, Anthony. 2009. *The Politics of Climate Change*. Cambridge: Polity Press.
- Gunderson, Lance H., and Crawford S. Holling (eds.). 2002. *Panarchy: Understanding Transformations in Human and Natural Systems*. Washington, DC: Island Press.

- Gupta, Anil K., and Sreeja S. Nair. 2011. "Urban Floods in Bangalore and Chennai: Risk Management Challenges and Lessons for Sustainable Urban Ecology." *Current Science* 100 (11): 1638–1645.
- Hardy, C. O. 1923. "Risk and the Management of Capital." *The University Journal of Business* 1 (2): 205–220.
- Harvard Law Review Association. 1920. "Marine Risk and War Risk." *Harvard Law Review* 33 (5): 706–709.
- Hawley, Frederick B. 1893. "The Risk Theory of Profit." *The Quarterly Journal of Economics* 7 (4): 459–479.
- Haynes, John. 1895. "Risk as an Economic Factor." *The Quarterly Journal of Economics* 9 (4): 409–449.
- Heinrichs, Dirk, Kerstin Krellenberg, Bernd Hansjürgens, and Francisco Martínez (eds.). 2011. *Risk Habitat Megacity*. Heidelberg: Springer.
- Herissant, Mons, and Thomas Stack. 1751. "Experiments Made on a Great Number of Living Animals with the Poison of Lamas, and of Ticunas." *Philosophical Transactions* 47: 75–92.
- Hernández-Guerrero, Juan, Antonio Vieyra-Medrano, and M. E. Mendoza. 2012. "Adaptation Strategies in Communities Under Precarious Housing: Flooding Risks in the Peri-urban Sector of the City of Morelia, Michoacán, México." *Applied Geography* 34: 669–679.
- Heynen, Nikolas C., Maria Kaika, and Erik Swyngedouw. 2006. *In the Nature of Cities: Urban Political Ecology and the Politics of Urban Metabolism*. New York: Taylor & Francis.
- Holdsworth, W. S. 1917. "The Early History of the Contract Insurance." *Columbia Law Review* 17 (2): 85–113.
- Horn, P. 1923. "The Bad College Risk." *The School Review* 31 (9): 670–679.
- Hough, Jerry F. 2001. *The Logic of Economic Reform in Russia*. Washington, DC: Brookings Institution Press.
- Japp, Klaus P. 1996. *Soziologische Risikotheorie: Funktionale Differenzierung, Politisierung und Reflexion*. Weinheim and Munich: Juventa.
- Japp, Klaus P. 2000. "Distinguishing Non-Knowledge." *Canadian Journal of Sociology* 25 (2): 225–238.
- Julca, Alex. 2012. "Natural Disasters with Un-Natural Effects: Why?" *Journal of Economic Issues* 46 (2): 499–510.
- Khazai, Bijan, James E. Daniell, and Friedemann Wenzel. 2011. "The March 2011 Japan Earthquake: Analysis of Losses, Impacts, and Implications for the Understanding of Risks Posed by Extreme Events." *TATuP* 20 (3): 22–33.
- Krause, Linda, and Patrice Petro. 2003. *Global Cities: Cinema, Architecture, and Urbanism in a Digital Age*. Piscataway, NJ: Rutgers University Press.
- La Porte, Todd R. 1975. "Organized Social Complexity: Explication of a Concept." In *Organized Social Complexity: Challenge to Politics and Policy*, ed. by Todd R. La Porte, pp. 3–39. Princeton, NJ: Princeton University Press.
- Lall, Somik V., and Uwe Deichmann. 2012. "Density and Disasters: Economics of Urban Hazard Risk." *The World Bank Research Observer* 27 (1): 74–105.
- Lindley, Dennis V. 2000. "The Philosophy of Statistics." *Journal of the Royal Statistical Society: Series D (The Statistician)* 49 (3) (September): 293.
- Luhmann, Niklas. 1990. "Technology, Environment and Social Risk: A Systems Perspective." *Industrial Crisis Quarterly* (4): 223–231.

- Luhmann, Niklas. 1993. *Risk: A Sociological Theory*. Berlin: de Gruyter.
- Luhmann, Niklas. 1995. *Social Systems*. Palo Alto, CA: Stanford University Press.
- Luhmann, Niklas. 1997. "Globalization or World Society: How to Conceive of Modern Society?" *International Review of Sociology* 7 (1): 67–79.
- Luhmann, Niklas. 2005. "Gleichzeitigkeit und Synchronisation." In *Soziologische Aufklärung 5: Konstruktivistische Perspektiven*, 3rd ed., ed. Niklas Luhmann, pp. 92–125. Wiesbaden: VS Verlag.
- Machiavelli, Niccolò. 1882. *The Discourses on the First Ten Books of Titus Livius: The Historical, Political, and Diplomatic Writings of Niccolo Machiavelli Vol. 2*. Boston: J. R. Osgood and Company. <http://oll.libertyfund.org/title/775> (accessed 21 February 2013).
- Marcuse, Peter. 2006. "Die 'Stadt': Begriff und Bedeutung." In *Die Macht Des Lokalen in Einer Welt Ohne Grenzen*, ed. Helmuth Berking and Ulrich Beck, pp. 201–215. Frankfurt: Campus-Verlag.
- Marx, Karl. 1869. *Der Achtzehnte Brumaire des Louis Bonaparte*. Hamburg: Otto Meissner.
- Mascareño, Aldo. 2011. "The Function of Ethics from the Perspective of the Individual." *Soziale Systeme* 17 (1): 186–210.
- Miles, Scott B., Rebekah A. Green, and Walter Svekla. 2011. "Disaster Risk Reduction Capacity Assessment for Precarious Settlements in Guatemala City." *Disasters* 36 (3): 365–381.
- Montaigne, M. 1968. *Essays Completos*. Barcelona: Editorial Iberia.
- Morrow, Betty Hearn. 1999. "Identifying and Mapping Community Vulnerability." *Disasters* 23 (1): 1–18.
- Morus, Thomas. (1516) 2002. *Utopia*. Cambridge: Cambridge University Press.
- Nassehi, Armin. 2002. "Dichte Räume: Städte Als Synchronisations- Und Inklusionsmaschinen." In *Differenzierungen Des Städtischen*, ed. Martina Löw, pp. 211–232. *Stadt, Raum und Gesellschaft* 15. Opladen: Leske & Budrich.
- NRC. 2009. *Science and Decisions: Advancing Risk Assessment*. Edited by the National Research Council. Washington, DC: National Academies Press.
- Pacione, Michael. 2009. *Urban Geography: A Global Perspective*. London: Routledge.
- Parsons, Talcott. 1982. *On Institutions and Social Evolution*. Chicago: University Of Chicago Press.
- Perrow, Charles. 1984. *Normal Accidents. Living with High-Risk Technologies*. New York: Basic Books.
- Price, Richard. 1770. "Observations on the Proper Method of Calculating the Values of Reversions Depending on Survivorships." *Philosophical Transactions (1683–1775)* 60: 268–276.
- Robinson, Tancred. 1714. "Miscellaneous Observations Made About Rome, Naples and Some Other Countries, in the Year 1683 and 1684." *Philosophical Transactions* 29: 473–483.
- Rowe, William D. 1977. *An Anatomy of Risk*. Wiley Series in Systems Engineering and Analysis. New York: Wiley.
- Sarmiento, Domingo Faustino. 1972. "The Dual Society: Argentina." In *Man, State and Society in Latin American History*, ed. Sheldon Liss and Peggy Liss, pp. 228–233. London: Pall Mall Press.
- Sassen, Saskia. 2001. *The Global City: New York, London, Tokyo*. 2nd ed. Princeton, NJ: Princeton University Press.

- Schneider, Stephen H., and Michael D. Mastrandrea. 2005. "Probabilistic Assessment of 'Dangerous' Climate Change and Emissions Pathways." *Proceedings of the National Academy of Sciences of the United States of America* 102 (44): 15728–15735.
- Schroer, Markus. 2006. *Räume, Orte, Grenzen: Auf Dem Weg Zu Einer Soziologie Des Raums*. Frankfurt: Suhrkamp.
- Shapiro, Susan P. 1987. "The Social Control of Impersonal Trust." *American Journal of Sociology* 93 (3): 623–658.
- Silvia, John. 2011. *Dynamic Economic Decision Making: Strategies for Financial Risk, Capital Markets, and Monetary Policy*. Hoboken, NJ: John Wiley & Sons.
- Simmel, Georg. 1950. "The Metropolis and Mental Life." In *The Sociology of Georg Simmel*, ed. Kurt H. Wolf, pp. 409–424. Glencoe, IL: Free Press.
- Simmel, Georg. 2004 [1900]. *The Philosophy of Money*. London: Routledge.
- Small, Christopher, and Terry Naumann. 2001. "The Global Distribution of Human Population and Recent Volcanism." *Global Environmental Change Part B: Environmental Hazards* 3 (3–4) (September): 93–109.
- Smithson, Michael. 1993. "Ignorance and Science Dilemmas, Perspectives, and Prospects." *Knowledge: Creation, Diffusion, Utilization* 15 (2): 133–156.
- Sprague, Thomas Bond. 1866. "On the Limitation of Risks; Being an Essay Towards the Determination of the Maximum Amount of Risk to Be Retained by a Life Insurance Company on a Single Contingency." *Journal of the Institute of Actuaries* 13 (1): 20–39.
- Strulik, Torsten. 2007. "Rating Agencies, Ignorance and the Production of System Trust." In *Towards a Cognitive Mode in Global Finance: The Governance of a Knowledge-Based Financial System*, ed. Torsten Strulik and Helmut Willke, pp. 239–258. Frankfurt and New York: Campus.
- Teubner, Gunther. 2010. "A Constitutional Moment: The Logics of 'Hit the Bottom'." In *The Financial Crisis in Constitutional Perspective: The Dark Side of Functional Differentiation*, ed. Poul F. Kjaer, Gunther Teubner, and Alberto Febbrajo, pp. 3–42. Oxford: Hart.
- Urry, John. 2009. "Speeding Up and Slowing Down." In *High-Speed Society: Social Acceleration, Power, and Modernity*, ed. Hartmut Rosa and Scheuerman, pp. 179–198. University Park: Pennsylvania State Press.
- Valladares, Licia. 2009. "Qu'est-ce qu'une Favela?" *Cahiers Des Amériques Latines* 34 (2): 61–72.
- Vance, W. 1908. "The Early History of Insurance Law." *Columbia Law Review* 8 (1): 1–17.
- Weber, Max. 1978. *Economy and Society*. Berkeley: University of California Press.
- Weiherr, Gregory R. 1991. *The Fractured Metropolis: Political Fragmentation and Metropolitan Segregation*. Albany: State University of New York Press.
- Wisner, Ben, Piers Blaikie, Terry Cannon, and Ian Davies. 2004. *At Risk: Natural Hazards, People's Vulnerability and Disasters*. 2nd ed. London: Routledge.