Self-organization in urban regeneration. *A two case comparative research*

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Abstract

Urban regeneration processes in which local stakeholders take the lead are interesting for realizing tailor made and sustainable urban regeneration, but are also faced with serious difficulties. We use the concept of self-organization from complexity theory to examine the relationship between local stakeholders' initiatives and vital urban regeneration processes. We conducted a two case comparative research, Caterham Barracks and Broad Street BID Birmingham (UK), in which local stakeholders take the lead. We analyze the evolution of these regeneration processes by using two different manifestations of self-organization: autopoietic and dissipative self-organization. We found that a balanced interplay between autopoietic and dissipative self-organization of local stakeholders is important for vital urban regeneration processes to establish. We elaborate four explanatory conditions for this interplay. These conditions provide at the one hand stability and identity development, but also the needed connections with established actors and institutions around urban regeneration and flexibility to adjust to evolving demands during the process of regeneration. However, consolidation of such initiatives does mean a challenge for existing structures for government, market and society that will need to adapt and change their roles to new governance realities. In this way self-organizing processes become meaningful in the regeneration of urban areas.

Keywords: Self-organization – urban regeneration – vital collaborations – complexity theory

1.   Introduction

Urban regeneration processes are processes that refer to vision and action building aimed to resolve urban issues and to bring about sustainable improvement in the economic, physical, social, and/or environmental conditions of an urban area that has been subject to change (Roberts, 2000: 17). As an emerging new form of governance, these practices are often the result of partnerships between actors in formal government, market, and civil society (Healey 2006). Urban regeneration processes are embedded in dynamic network environments, in which different governmental agencies, commercial actors, non-for-profit organizations and residents reshape urban areas and are dependent of each other (Wagenaar, 2007; Taylor, 2007). In this matter, we see that the need and importance of public engagement in the field of urban regeneration is stressed nowadays, although the extent, the results and the way in which this could or should be organized is certainly not straightforward (e.g. Campbell and Marshall, 2000; Innes and Booher, 2004; Bond and Thompson-Fawcett, 2007). In this article we approach participation as a multi-way set of interactions among governmental parties, citizens or businesses and other actors who together produce outcomes (Innes and Booher, 2004). We focus on community-led initiatives in the context of urban regeneration. Local or community based initiatives from citizens or businesses seem to be valuable for producing urban regeneration, since such initiatives bring about development that starts from within the urban area itself, enhancing the chance that the regeneration fits local needs and circumstances

and enhancing the commitment of the involved local stakeholders and therefore the implementation of visions and plans (Sullivan and Skelcher, 2002; Wagenaar, 2007).

However, the difficulty of putting local initiatives from non-state actors into practice is also well-noted in the literature, for example because of the lack of resources and power of these actors (e.g. Chaskin and Garg, 1997) or the difficulty of making effective connections with governmental institutions to guarantee implementation (e.g. Edelenbos, 2005; Healey, 2006). Therefore, the establishment of vital actor relations in order to collaboratively create and maintain urban areas of high qualities is stressed in the literature (e.g. Healey, 1998; Innes and Booher, 2004). For example, the establishment of vital relationships between community-led initiatives and organizations of representative democracy, which are important for dealing with recurring issues in urban regeneration (Campbell and Marshall, 2000; Edelenbos and Van Meerkerk, 2011).

In this article we therefore depart from the proposition that the success of local regeneration initiatives depends on the extent in which these initiatives are evolving within vital collaborative multi-actor relationships. In this respect, insight is missing in how these initiatives lead to vital collaborations among actors trying to realize urban regeneration (see also Taylor, 2000; Innes and Booher, 2004). We want to enhance the understanding of the emergence of community-led initiatives in sustainable improvements in the economic, physical, social, and/or environmental conditions of urban areas. We use the concept of self-organization from complexity theory to theoretically approach and elaborate the emergence and evolution of community-led initiatives. We see self-organization as a useful concept in the context of urban regeneration, because it explicitly focuses on the dynamics within urban systems and the evolution of interactions between different stakeholders, which could lead to new system behaviour and ultimately to the transformation of urban areas (cf. Wagenaar, 2007; Teisman et al., 2009; De Roo, 2010). The following research question is leading for our research and article: "how do local initiatives, approached as self-organization, evolve and which conditions facilitate them to develop into vital actor relations for urban regeneration?" We conducted a two case comparative research of two urban regeneration projects in the UK: Caterham Barracks and Broad Street BID Birmingham. These cases are examples of urban regeneration processes in which local actors (users, residents) took initiative and responsibility. In the following section we provide our theoretical and analytical framework, in which we elaborate two different forms of self-organization, i.e. autopoietic and dissipative self-organization. Subsequently, we will analyze our two cases, resulting in a case comparative analysis. Finally, in section 7 we draw conclusions.

2. Theoretical framework: framing self-organization

We argued in the introduction that we approach local urban regeneration as processes of self-organization. In this section we theoretically elaborate the concept of self-organization. Self-organization is generally associated with complex system thinking as developed in physics, and broadly described as the emergence of new structures ('order') out of 'chaos' (Prigogine and Stengers, 1984). Notions of complexity have not just remained within physics, but have also influenced social sciences and more specifically, planning and governance studies (e.g. Wagenaar, 2007; Teisman et al, 2009; De Roo, 2010). Complexity thinking could be useful for studying processes of change in complex network environments, such as urban regeneration, because it explicitly focuses on the dynamics of systems. It approaches systems as being in a

continuous flux, in processes of becoming instead of being, emphasizing the continuous interaction between different elements forming a system. Self-organization is defined here as the emergence and maintenance of structures out of local interaction, an emergence that is not imposed or determined by one single actor, but is rather the result of a multitude of complex and non-linear interactions between various elements (Cilliers, 1998; Heylighen, 2002; Jantsch, 1980).

Autopoietic and dissipative self-organization
The literature on complex systems and self-organization distinguishes autopoietic and dissipative system behaviour Autopoietic self-organization is about self-maintenance and reproduction of systems (Jantsch, 1980). This concept is developed in biology, but has also inspired social scientists and even led to Luhmann's famous theory of autopoietic or self-referential systems (e.g. Luhmann, 1995). Autopoietic self-organization is aimed at stabilizing and sometimes intensifying boundary judgments in social settings, attain an existing structure and maintain it in self-referentiality (cf. Luhmann, 1995).

Complex systems also show dissipative self-organization. Prigogine (Prigogine and Stengers, 1984) specifically focuses on this type of system behaviour in his research. He argues that dissipative behaviour is boundary breaking, leading to evolution of systems. As opposed to irreversible physical processes which play a 'destructive role' (which develop towards a situation of equilibrium and thus inertia), Prigogine observed and analyzed irreversible processes which play a 'constructive role': the so-called dissipative structures (Bor, 1990). Dissipative behaviour refers to the (increasing) connection of various subsystems leading to a highly dynamic process heading towards far-from-equilibrium situations (Jantsch, 1980; Prigogine and Stengers, 1984; Heylighen, 2002; Morçöl, 2005). In these far-from-equilibrium situations, systems are much more sensitive to external influences and their behavioral patterns are non-linear; small changes in the components of a system may lead to large-scale changes (Morçöl, 2005: 11).

Complex systems (physical as well as social) that show both types of self-organization can be in situations of so-called 'bounded instability' (Merry, 1999; Stacey, 1995). In a situation of bounded instability "…the organisation can find the mix of confirmation and novelty that allows it to be a learning system that is able continually to self-organize and thus renew itself" (Merry, 1999: 275). In situations of equilibrium, systems are too static to be really adaptive to new, unanticipated situations. Such a system can grow isolated and thus become irrelevant to its environment. On the other hand, when a system is totally unstable, it is not capable to respond in a coherent way to new challenges and could easily become rudderless. Situations of bounded instability are thus characterized by both autopoietic and dissipative system behaviour.

Vital actor relations
In literature on collaboration and networks the importance of vital actor relationships is indicated. Healey (2006) argues that institutional or relational capacity is important to develop and realize cooperation and collaboration. Also the literature on networks stresses the importance of actor relationships. Meier and O'Toole (2001) for example found that networking activities have positive impact on the effectiveness of these actor relations. Other scholars mention that vital actor relations are characterized by trustworthiness which is developed and maintained by repeated interaction among actors in the network (Edelenbos and Klijn, 2006). Network management activities

are important to bring actors together and develop trustworthy and vital actor relationships and networks (Klijn et al., 2010).

Vital networks are those networks in which actors have positive interdependent relationships and in which actors frequently meet and exchange visions, meaning, interests, information and knowledge (c.f. Sullivan and Skelcher, 2002; Healey, 2006). Vital actor relations develop joint fact finding and mutual understanding of problem situations (Healey, 1995). Actor relations are not dominated by conflicts or deadlocks, but are characterized by ongoing interaction leading to joint strategies to solve problems. For the establishment and maintenance of vital actor relationships an active role of so called 'boundary spanners' is indicated as an important condition (Alter and Hage, 1993; Friend et al, 1974; Williams, 2002). These are people who are skilled communicators, able to 'talk the right language' of the different forums or networks in which they are active, and have excellent networking skills giving them the ability to gain entry to a variety of settings and to seek out and 'connect up' others who may have common interests or goals (Sullivan and Skelcher, 2002: 100).

In sum, many scholars mention the importance of vital actor relationships in complex planning and governance processes, because they lead to collaboration and trust between interdependent actors and subsequently to more legitimate and effective policy outputs. We are therefore interested in how processes of self-organization are related to vital actor relations, or more specifically: how autopoietic and dissipative behaviours contribute to the establishment of vital actor relations in the context of urban regeneration. In the next paragraph we operationalize this relationship.

Self-organization in urban regeneration: the analytical framework
Building on the previous sections, we translate self-organization to urban regeneration processes as the emergence of governance structures in which local stakeholders (residents, businesses, non-for-profit organizations, etc.) have a pivotal role. It is framed as an interplay of autopoietic and dissipative self-organization when these local stakeholders take initiative to come to collective and collaborative action. We focus on the relation between the interplay of autopoietic and dissipative self-organization on the one hand and vital processes of urban regeneration on the other hand. We want to find explanatory conditions in this relationship (see figure 1). We are especially interested in how these kinds of self-organised behaviour lead to vital actor relations in which different actors work together in a collaborative way, and what elements are crucial in this process.

Figure 1: conceptual framework

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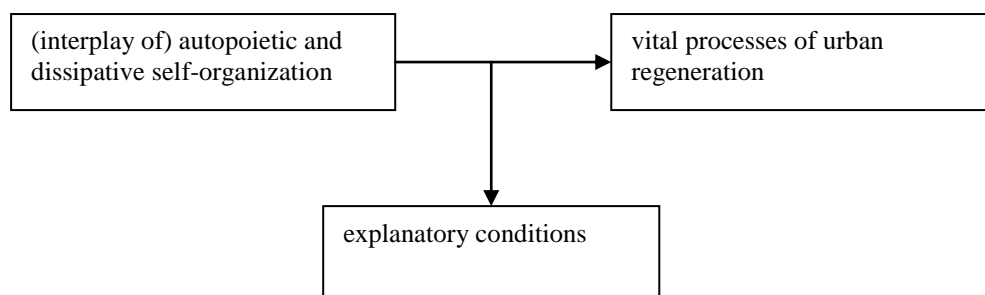
Below we define and operationalize our three core variables in our research. We define dissipative self-organization as the openness of social systems and the exploration for (increasing) interconnection of different subsystems leading to highly dynamic and vital processes (c.f. Jantsch, 1980; Teisman et al, 2009). This type of self-organization is characterized by external orientation, wide boundary judgments and production of new structures and processes (Flood, 1999; Teisman et al, 2009) in which variety and redundancy of ideas (plans, content) and actors is aimed for. These new structures and processes often goes at the expense (in terms of attention, time, energy, resources) of existing structures and processes leading to tensions between 'the new' and 'the existing'. We define autopoietic self-organization as the inwards orientation of social systems that is about self-maintenance, identity forming and stabilization, and reproduction (c.f. Jantsch, 1980; Luhmann, 1995). Autopoietic self-organized systems are characterized by internal orientation, narrow boundary judgments and stability (reproduction, maintaining) in structures (Flood, 1999; Teisman et al, 2009) in which variety and redundancy of ideas (plans, content) and actors are countered.

We define vital actor relations as the way in which different actors develop relational capacity, jointly and collaboratively develop problem definitions and solutions in the urban area (c.f. Sullivan and Skelcher, 2002; A, 2005; Healey, 2006; B et al, 2010). The processes are characterized by ongoing interaction in which mutual communication and understanding are present and high-level conflicts (i.e. sharp differences of opinion and interests) are absent.

Table 1 summarizes the indicators for autopoietic and dissipative self-organization. We want to stress here that the distinction between autopoietic and dissipative self-organization is purely analytical. In practice we see that the two are simultaneously present and reciprocal to each other. In case description and analysis we also see this intermingling of the two.

Table 1: operationalization of the three core variables

Main variables	Indicators
Dissipative self-organization	- external orientation through a) open boundaries, and b) looking for exposure - wide orientation through a) exploring new content, and b) involving and connecting a large number of actors in new actor constellations
Autopoietic self-organization	- internal orientation through a) closed boundaries, and b) strengthen internal identity - narrow orientation through a) explicating and consolidating content, and b) stabilizing existing actor constellations or even reducing the number of involved actors
Vital urban regeneration	- co-production through a) joint problem-definition and b) joint solution finding - ongoing interaction through a) the presence of mutual communication an understanding, and b) the absence of high-level conflict

Case studies

We selected two cases in which a certain level of self-organisation was present, thus in our view providing examples of self-organization in urban regeneration. The case Caterham Barracks Community Trust is an example of community-based initiative

that led to a self-organizing community trust. The case Broad Street Birmingham is an example of the establishment of a Business Improvement District in which property owners and business actors develop pro-active behaviour and self-organizing capacity for redeveloping the urban area.

We conducted theory-informed case studies in a focused way, to empirically analyze a particular theoretically relevant issue, self-organization in urban regeneration, and generate new theoretical knowledge from the empirical analysis. The research design of two case studies does not enable us to develop generalized empirical knowledge but it does provide a detailed understanding of contextual and situational conditions that influence the evolution of self-organization and the interplay with vital collaborative regeneration processes. From the cases we draw theoretical insights, which need to be empirically validated in other contexts before we know whether they can be generalized. This is in accordance with conventional case study methodology (e.g. Stake, 1998; Yin, 1984). We conducted an instrumental case study rather than an intrinsic case study (Stake, 1998). In an instrumental case study the researcher uses a case to gain more understanding about a particular phenomenon of interest. An intrinsic case study is carried out because of an interest in the case itself, and what happens in the case. We used the cases to develop new insights (emerging from the cases) in finding facilitating conditions for self-organizing processes in urban regeneration. The explanatory conditions that we find in the cases are derived from the interviews.

Data were collected through a combination of interviews, observations and document analyses. All relevant written documents were subjected to accurate study, such as memos, reports, newsletters, proposals, websites, political documents, statutory instruments etc. In addition, key players in both cases were interviewed: the involved individuals in the initiatives (local residents in Caterham and the BID management in Birmingham) and other involved actors in the regeneration process, such as civil servants of the local authority, council members, developers and other involved governmental agencies. The interviews were semi-structured. Firstly, the process and history of the cases were reconstructed. Secondly, questions were asked about the indicators mentioned in table 1: how did the self-organization develop and how did they demarcate the content and the process of the regeneration: how did they involve other actors, how did they decide on the themes and projects of the regeneration and how did they structure the interactions and communications with the other involved actors and the local community? In the next two sections the analysis of the cases is presented. In our analysis we focus on the behaviour of individual actors within the interaction regarding the regeneration processes.

3.   **Introduction of the case studies**

Both regeneration processes started off in the nineties and are examples of local stakeholders taking responsibility for the vitality of their urban environments. An important difference concerns the initiators of the self-organization: the Broad Street Birmingham case was initiated by private businesses, while the Caterham Barracks case was initiated by local residents. Below, the two cases are further introduced. Table 2 compares the cases regarding their main characteristics. To structure our analysis, we use the rounds model of Teisman (2000) on policy and decision-making processes. This model fits our complexity perspective on urban regeneration, because it is focused on the variety of actors involved in decision-

making processes and the dynamics resulting from their interactions. Each round is ended with a crucial decision or event (e.g. the involvement of a new actor), defined by the researchers in retrospect, but based on the reconstruction of the process by the respondents. The crucial decision or event is the beginning of a next round, and generally serves as a focal point of reference for the actors involved. Both regeneration processes could be divided in four rounds (see table 2).

Caterham Barracks
Caterham Barracks is an urban regeneration project, developed and managed in a cooperative process between local community, a private developer and the District Council. The site is located in the North-western edge of Caterham-on-the-Hill. Caterham is a town in the Tandridge District of Surrey and located south of London. The self-organizing character of the case is represented by the emergence of the Caterham Barracks Community Trust, in which local residents took responsibility for developing and managing community facilities and played a key role in the regeneration process. Caterham Barracks refers to a Depot used by the army until 1990 when it was declared redundant by the Ministry of Defence.

----------------Please insert *'Figure 2: overview geographical area Caterham Barracks'* around here-----------------

In 1995 the barracks were closed. This affected the local economy and the character of the area, since the population of the Barracks had for a long period of time contributed to the social life and economic well-being of the local area (Tandridge District Council, 1998: 2). When the Barracks were closed, interactions between local residents and the District Council commenced, aimed at preserving the area (Interview CBCT, 2009). In this way the demolition of the historical buildings and the construction of high- and middleclass housing was prevented; the scenario most interesting to private developers. From that moment on the redevelopment of the area became a process in which local residents in cooperation with a private developer played a key role.

Broad Street Birmingham
Broad Street BID Birmingham is a Business Improvement District, initiated by local businesses, property owners and the Birmingham City Council. The main goal of the organization of this BID was to bring down the nuisance of the night-time economy on the business environment within the Broad Street area (see figure 3).

----------------Please insert *'Figure 3: overview geographical area Broad Street Birmingham'* around here-----------------

The self-organizing character of the case is represented by the emergence of the BID, in which local business took responsibility for developing and managing their environment. The concerns about the business environment on and around Broad Street Birmingham started off in the early nineties. The establishment of a convention centre in this part of the city centre boosted the local economy around Broad Street, both for offices as for the emerging night-time economy. The quality and reputation of the area became seriously challenged as the night-time economy started to cause increasing nuisance, thus devaluating the expensive real estate investments made in the area. When a person was killed during a night-time fight, interactions between

local businesses, city council and police started around the issues on Broad Street. Consequently, local businesses took initiative to solve the controversy between "drunks and bankers". From that moment, the BID played a key role in the regeneration of the area.

Table 2: main characteristics of the two cases

	Broad Street Birmingham	**Caterham Barracks**
Key actors	Broad Street businesses Property owners and developers City Centre Partnership West Midland Police Broad Street BID	Local Group Private developer District Council Caterham Barracks Community Trust
Issue	The BID is established to counter the controversy between "drunks and bankers" and to make Broad Street "cleaner, brighter and safer".	Closing of the Barracks has impact on the local economy and the character of the area. The redevelopment of the site is a chance to create new vitality for the area.
Timeframe	Round one: 1991 – 2003, Growing controversies	Round one: 1995 – 1997, Redefining the Barracks
	Round two: 2003 – 2004, Establishing the BID	Round two: 1998, Plans for redevelopment
	Round three: 2004 – 2009, Operating the BID	Round three: 1999 – 2000, Establishing governance arrangements between main actors
	Round four: 2009 – 2010, Expanding the BID	Round four: 2001 – 2010, The Community Trust in action
Legislation	Business Improvement District (Statutory Instrument 2004: 2443)	Section 106 Agreement between private developer, local authority and Community Trust
Size	Approximately 100 acres and over 300 businesses	57 acres divided in three parcels, Approximately 400 new houses.
Budget	Approximately £ 400,000 p.a. since 2004.	Initial investment of £ 2,000,000 by private developer for community benefits

In the next section the case studies are described and analyzed by focusing on autopoietic and dissipative characteristics.

4.   Analyzing the Caterham Barracks regeneration process

In this paragraph the urban regeneration of Caterham Barracks is analyzed by the concepts of dissipative and autopoietic behaviour and vigorous actor relationships. Table 3 summarizes the results of the analysis. The indicators of table 1 are marked (in bold) to explicate the autopoietic and dissipative elements.

Table 3: dissipative and autopoietic self-organization within the case Caterham Barracks

Time frame	Dissipative self-organization	Autopoietic self-organization
Round 1 (1995-1997): Redefining the Barracks	**Exploration** of what the former Barracks (and the area) could mean for the local community Interaction process in which **different actors are connected**	Development of some clear guidelines and protection of the area: **explication** of what should be maintained **Stabilization** of the involvement of a certain group of individuals: the Local Group
Round 2 (1998): Plans for redevelopment	**Explorative planning process** in which a **large numbers of actors** are involved **Connection** between ideas and interests Local Group, private developer, local community and local authority	'**Selection**' of ideas for community facilities and future management organized by Local Group
Round 3 (1999-2000): Establishing governance arrangements between main actors	**Exploration** of effective cooperation structure between Local Group, private developer and local authority; **Intensive interactions** between Local Group, private developer and local authority	**Refinement** of plans towards implementation **Formalization** of arrangements between main actors: **dividing responsibilities** **Establishment** of Community Trust
Round 4 (2001-2011, still running): The Community Trust in action	Community Trust is looking for **exposure**: it seeks for sustainable user groups for running community facilities.	**Decreasing interactions** between main actors **Internal orientation**: Community Trust is increasingly focused on internal management and running business

4.1 Dissipative and autopoietic self-organization in the regeneration process

Below, the elements of dissipative and autopoietic self-organization are elaborated for each round of the process.

Round 1 (1995-1997)

Dissipative behaviour
After the Barracks were closed, an interactive process developed, which was characterized by increasing interaction between local residents, local government officers and local councillors, about the redevelopment of the area. An important figure in connecting these different actors was the later chairman of the Community Trust, living in Caterham and at that time a District councillor. He wanted to explore the possibilities for making the redevelopment of the site more productive for the local community. In this respect, a forum for discussion about the future of the Barracks' site was formed: the so-called Local Group. This Local Group consisted of representatives from different community groups, officers and councillors of the District and members of the Caterham Residents' Association and it reported back to the District Council (TDC, 1998; Interview TDC, 2009). To protect the area from building houses and demolition of the historical buildings, the Local Group wanted to turn the site into a Conservation Area (see below). This required local consultation and was an important trigger for wider community participation. Through bus tours, organized by the local government, local residents were taken into the area and asked if the site should be preserved (Interview TDC, 2009). Furthermore, local residents were invited to vote for different development scenarios, which were co-produced by the local authority and the Local Group. This consultation attracted a high response. About 1300 people voted (TDC, 1998). The scenario with the minimum amount of housing, an emphasis on retaining the best buildings and convert them for employment, and providing various community facilities attracted the most votes, i.e. 66%. According to the later chairman of the Community Trust and the private developer, this scenario was financially unrealistic or at least very difficult to realize and economically not sustainable, but it provided a clear statement of what local people wanted with the site (Interviews CBCT, 2009; private developer, 2009).

Autopoietic behaviour
Two important focal points for setting boundaries concerning the content of the regeneration process were the protection of the area from housing and the prevention of the demolition of the historical buildings. There was high consensus in the local community that a development strategy focused on building new houses would not be beneficial for increasing the vitality of the urban area (TDC, 1998; Interview CBCT, 2009). Such an area, in which mainly newcomers would settle, would not be connected to the local community. Furthermore, the historical buildings would have to be knocked down, which would significantly harm the historical meaning of the site for local residents. The chairman of the Community Trust notes on this matter: "*it was the institution [Caterham Barracks] that created this part of Caterham. In terms of the historical growth of this place, it is really important. Just to knock it down doesn't really do anything sensible with it.*" (Interview CBCT, 2009). Therefore, in consultation with the local community, the site was turned into a Conservation Area by which development initiatives were restricted if they would harm the historical value of the area.

On the basis of the selected scenario, the Council produced a development Brief for the bidding process in which community benefits were ensured, such as employment uses, community facilities, recreational and sport uses and in which it was clearly

stated that new residential development only would permitted if sufficient community benefit is demonstrated (TDC, 1998: 5).

Round 2 (1998)

Dissipative behaviour
Because of the specific conditions about combining different spatial and societal functions, different developers left the bidding process. "*A lot of the larger houses builder companies just walked away and thought [...] there is no way we want a piece of this, this is far too complicated. We just want to build a few houses, that's what we do. We don't want to get involved in employment or community facilities, that's far too complicated.*" (Interview private developer, 2009). A relatively small, but upcoming, company decided to invest in this project: "…because it was on our doorstep, we felt we had the time to invest in try to make this work." (Ibid). To make the project financially more beneficial and because of the restrictions of the development Brief, the developer took a broader perspective than simply focusing on housing and wanted to connect housing with integral spatial development and the delivery of community facilities. It started an interactive planning process with local residents to explore the possibilities for this perspective. In this respect, a community planning week was organized which attracted contributions from over 1000 people. For the consultants who facilitated this collaborative planning process, it was the first time a private developer approached them. "*But what was interesting in Caterham; it was the first time for us with a private sector client saying 'that's sounds like a good idea', to actually engage people in this project.*" (Interview organizers collaborative planning process, 2009). During the planning weekend the private developer was focused on connecting housing and the development of new kinds of community facilities to make the scenario financially more attractive. "*The offer here was; well look guys, this [the scenario in the development brief] is not a deliverable plan at all. [...] What you need is more housing and the housing can then deliver the community facilities. And all of a sudden people say: we can have the community facilities and they get hooked on what they can have and probably less concerned about the housing, which was what happened.*" (Interview private developer, 2009). At the end of this planning weekend, it was agreed that both more facilities and more houses could be developed than initially noted in the development Brief (Interviews CBCT; private developer, 2009).

Autopoietic behaviour
An important autopoietic characteristic in this round is the quest of the private developer for commitment in terms of involvement towards the Local Group. This Local Group was until then a broad group of people from various community organizational backgrounds. The private developer was willing to cooperate with this group, but wanted commitment and convergence to financially deliverable plans (Interview private developer, 2009). The result was a stable and smaller group of local residents who were very willing to get involved. In cooperation with the private developer, the Local Group set up several working groups to further elaborate the ideas concerning the community facilities and its future management. These working groups were organized around specific themes, such as land use, youth, environment, arts and recreation, and employment and enterprise and created boundaries regarding the scope of the projects (Website CBCT, 2002; Interview CBCT, 2009). In cooperation with the private developer, financially undeliverable plans were

eliminated (Website CBCT, 2002; Interview private developer, 2009). Furthermore, only local residents were involved, because the idea was to give them responsibility for the management of community facilities (Interview CBCT, 2009).

Round 3 (1999-2000)

Dissipative behaviour
After the Planning weekend and the further development of the site, there was increasing interaction between the private developer, the local authority and the 'new' Local Group. In this process strategies were formed about the question how to make the regeneration initiatives and projects sustainable and community driven. An effective cooperation structure was explored about the future ownership of specific community buildings, land and community facilities (Interviews private developer; TDC; CBCT, 2009). Using the legal framework of the Town and Country Planning Act, a so-called S106 agreement[1] between the developer, the local government and the Local Group was formed. The Local Group turned into the Caterham Barracks Community Trust. The developer contributed in excess of £2 million pounds in buildings and money to this project. The assets and the land for community facilities were transferred to the Community Trust.[2]

Autopoietic behaviour
In this round the identity of The Local Group evolved into a more formal entity: the Caterham Barracks Community Trust. The objectives of the Trust were to facilitate the development of the community facilities and activities, aimed to maximise the benefit for the local community (Interview CBCT, 2009). The interactions between the private developer, the local authority and the Local Group were formalized and stabilized by the development of an accountability structure: from that moment forward, representatives from the local authority and the developer sit on the Trust's Board and oversee the management of the community facilities (TCPA, 2007: 37).

Round 4 (2001-2011 and still running)

Dissipative behaviour
After its establishment, the Trust started looking for exposure. Different self-organizing user groups, having evolved from the working groups, were sponsored and facilitated in their management. The Trust used its funds to establish a range of economic, social, educational, cultural and sports facilities, such as an indoor skate park, a centre for arts and recreation, a cricket field, a children's play area, a nature reserve/community farm, a centre for enterprises and a football club. The Trust functioned as a platform or 'springboard' for these user groups to run certain community facilities and it holds an open attitude towards potential user groups. User groups are allowed to run a community facility on their own and ultimately to own the particular asset, if they are able to financially sustain themselves and to provide

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[1] S106 stands for 'Section 106 agreement', which is generally used by planning authorities to secure benefits for the community from planning approvals that cannot be secured in other ways (NLGN, 2002: 12). Developers often have to lodge bonds with the planning authority to the value of the amount they have to invest back into the community. The bond is only returned when the authority is satisfied that the developer has complied with the agreement.

[2] The CBCT owns the cricket green, the pavilion, the Officers Mess, the NAAFI, the Old Gymnasiums and the football fields.

community benefits (Interview CBCT, 2009). In the end, all the community facilities should be self-sustainable.

Autopoietic behaviour
After the establishment of the Trust and the handing over of the community assets, the interaction between the private developer and the local authority and the Trust decreased. The Trust increasingly concentrates on its own task and defends its own interest against that of the private developer. There are some disagreements about the time schedules according to which the Trust gets the full financial responsibility over the community assets. At the same time the communication with the local community is less frequent compared to previous rounds of the process. In this round the internal orientation of the Trust increases.

4.2 Relating self-organization to vital actor relations in the regeneration process

The regeneration process started with increasing interactions between local residents, local councillors and civil servants to make sense of the closing of an institution which had been an important part of the identity of Caterham. According to the different respondents, the boundary spanning work of the later chairman of the Community Trust was highly important here. These dissipative characteristics evolved into vital actor relations in which joint problem-definition and joint solution finding were produced: the preservation of the site and the need to connect future developments of the site with the local community. The adaptive behaviour of the private developer in the second round is stressed by the respondents. The developer broadened his scope on housing and explicitly decided to develop the site in co-production with the local community. In this way the vital actor relations were maintained and further evolved. Autopoietic behaviour is observed in the stabilization and reduction of the number of involved actors: local residents who were committed and willing to stay involved got a seat in one of the working groups of the Local Group. In the next round the cooperation between de Local Group, the private developer and the District Council led to a governance arrangement concerning the future management of the site. The District Council showed adaptive behaviour in this round by giving the Community Trust a leading role. Subsequently, the Trust evolved into a more formal entity with its own way of working. According to the chairman, the Trust model is a very useful model for community-led regeneration. It provides both the flexibility and legal capacity to evolve in accordance with the needs of the community (Interview CBCT, 2009). It was able to facilitate the different user groups in their efforts, contributing to the urban regeneration. At the same time, however, the interactions with the other actors are decreasing. In this respect, the Trust increasingly enacts autopoietic behaviour. As a result, actor relations seem to becoming less vital.

Table 4: dissipative and autopoietic system behaviour within the case Broad Street Birmingham

Timeframe	Dissipative self-organization	Autopoietic self-organization
Round 1 (1991 – 2003): Growing controversies	Internal **cohesion is weakened**. Growing controversy between "drunks and bankers"	More and more specialization in business activities: Convention Quarter. External **identity is strengthened**. Businesses do not look beyond

		their regular business **boundaries**.
Round 2 (2003 – 2004): Establishing the BID	After the fight, **open, explorative and informal** explorations for solutions for Broad Street. **Connection** made to BID legislation, translation to local circumstances. Attempts to **involve more businesses** and get them to vote 'yes' for the BID. **Exposure** through newsletters, website.	Shared responsibility and interest among the different users and stakeholders of Broad Street is emphasized. **Defining** the BID: content, boundaries and involved actors are set. BID is **formalized** when most businesses vote in favour of the BID.
Round 3 (2004 – 2009): Operating the BID	**Exposure** to the BID through newsletter and website, in order to attract new investments and to establish a positive reputation for the area.	**Interaction** within a **stabilized and defined** group of actors. **Responsibilities are divided**. Executing projects, strengthening internal organisation and incorporating new ideas into the BID organisation.
Round 4 (2009 – 2010): Expanding the network	New content for the BID2 is explored, **new actors** get involved.	In the BID2 proposal, the **same organizational structure** is carried on.

5.   Analyzing the Broad Street Birmingham regeneration process

In this paragraph the urban regeneration of Broad Street Birmingham is analyzed by the concepts of dissipative and autopoietic behaviour and vigorous actor relationships. Table 4 summarizes the results of the analysis. The indicators of table 1 are marked to explicate the autopoietic and dissipative elements.

5.1 Dissipative and autopoietic self-organization in the regeneration process

Below, the elements of dissipative and autopoietic self-organization are elaborated for each round of the process.

Round one (1991 – 2003): Growing controversies

Autopoietic behaviour
In this round, the period before the catastrophic fight took place, individual businesses acted within their regular business activities. On the level of the Broad Street area, a specialized business area emerged with two main functions: business and service

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activities on one hand and a thriving night-time economy on the other, each of them successful in their own account (Interview BID manager 2010).

Dissipative behaviour
In the Broad Street area, internal cohesion was weakened as conflicts arose between specialised functions of offices and the night-time economy. The dissipative element of the 2003 fight was that from that moment on, an interaction process between actors started in which the various possibilities for dealing with the "bankers and drunks" controversies on Broad Street were explored.

Round two (2003 – 2004): Establishing the BID

Dissipative behaviour
After the catastrophic fight, deliberations started between the businesses of Broad Street, the West Midland police and the Birmingham City Centre Partnership (a public organisation established in 2001 to maintain and improve relationships between the city council and the Birmingham business community). These deliberations first took place in an informal partnership, emphasizing the shared responsibility and interest among the different users and stakeholders of Broad Street. In 2004, three summits were organised in order to address the local problems of "bankers and drunks". In between the summits, businesses involved in the deliberations went around the area to talk to the other businesses. The City Centre Partnership was connected to the national Association of Town Centre Management (ATCM) which was at that time promoting the new concept of Business Improvement Districts (BID) throughout the UK. During the Broad Street summits, the BID concept was brought up and met with great enthusiasm, because it would enable businesses themselves to take a leading role (Interview BID manager, 2010). The City Centre Partnership invested the people, money and time to develop a BID, thereby meeting local parameters and following the procedures of the BID legislation.[3] Because of the BID, interactions between the local businesses increased. The motives to choose for this specific institutional form were mostly opportunistic and pragmatic: "*Broad Street shows how timely things can be. The BID legislation came in, as a sort of vehicle to take things forward.*" (Interview City Centre Partnership, 2010).

Autopoietic behaviour
The autopoietic element of the 2003 fight was that through these events the mutual dependence of the two main functions on Broad Street became visible. According to the later employed BID manager everybody, including businesses, police and hotels, was suffering from the events at that time (Interview BID manager, 2010). When the BID legislation was introduced during this round, this legislation played an important structuring role in the further deliberations among the involved actors. Soon as the BID legislation was adopted and adapted to the local parameters, the legislation caused autopoietic behaviour in the sense of providing a specific identity and structure for local businesses. Businesses were being convinced of the deliverables the BID

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[3] The BID legislation is a statutory instrument in order to promote partnership working between local authorities and local businesses. The regulations contain some general rules and requirements concerning a BID proposal. A BID can be initiated by non-domestic ratepayers in a certain geographical area, parties with an interest in land (landowners or landlords), bodies with a purpose to develop BID proposals, or the relevant billing authority (district, county of city council) (Deputy Prime Minister 2004, Statutory Instrument 2004: 2443)

could provide for the amount of money the levy would be. The boundaries, both in content, geography and the membership were set up, the binding identity of the businesses involved became explicated and the organisational structure and the BID levy were agreed upon. The original controversy between "bankers and drunks" was still structuring this process, as is represented by three levels of levy: the premises closest to Broad Street have to pay the highest amount of levy, and the themes the BID would work on: safety, cleaning, greening and image building (Interview BID manager, 2010, Broad Street BID proposal 2005). The establishment round ended with the acceptance of the BID proposal in 2005. 65% of the non-domestic ratepayers of the BID area turned up for the vote, and 92% of them voted in favour of the BID (BID update No.4 May 2005)[4].

Round three (2004 – 2009): Operating the BID

Autopoietic behaviour
The organizational structure set out in the BID proposal was followed, with an annual assembly for the levy payers and reports about the deliveries of the BID. The businesses participated in working groups, or raised issues of concern to the BID manager, who was instated to handle both the internal as the external matters of the BID on behalf of the BID board. The BID manager started to lead a day and a night team. The day team concerned communication, strategic delivery and promotion of the area. The night team consisted of wardens patrolling the BID area at night, and occasionally managing events. The BID manager was also the main contact point between local businesses and other parties involved in the Broad Street controversies (local authority, police etc.) (Interview BID manager, 2010). The interactions in this round aim at executing projects along the themes presented in the BID proposal, which relate to the "bankers and drunks"-problem: marketing to counter the negative reputation of the neighborhood, safety to address the anti-social behaviour and cleanliness to prevent littered streets after the weekends. Streets were refurbished and greened, events were organised, empty buildings were covered with promotional banners, safety was improved. Occasionally, new ideas were adopted and executed as well, but only if they fitted the clearly demarcated lines of the BID proposal.

Dissipative behaviour
The BID gave exposure of its actions in order to establish a positive reputation for the neighbourhood again, through a website, marketing campaign and close contact with press agencies. The BID worked on giving the businesses of Broad Street a voice on the plans and policies for the Broad Street area by other actors (Interview BID manager).

Round four (2009 – 2010, and still running): Expanding the BID

Autopoietic characteristics
In the preparation of the re-ballot, major attention was given to re-assure the earlier benefits of the BID and its network. In the proposal BID2, prepared to put forward in re-ballot, the key achievements and the new areas of work were mentioned. "*The BID has consistently delivered on its promises to improve the environment for business.*"

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[4] For a ballot to be legitimate, the turn over has to be at least 30%, of which half should be voting in favour of the BID, representing a minimum 50% of all rateable value in the BID area (Statutory Instrument 2004: 2443).

(BID2 proposal, 2009) The BID2 proposal still put forward the initial controversy of "bankers and drunks" as the major concern of the BID, and warned for a return to that situation if the BID is not to be continued (BID2 proposal, 2009, Interview BID manager, 2010). The existing organization was reassured and maintained.

Dissipative behaviour
Apart from continuing with the current work, two new themes were introduced. These were 'developing' (targeting vacant buildings, regeneration in partnership with West Midlands Advantage) and 'connecting' (aim at lobbying for a rapid transport solution system and better connections). An effort was made to make the BID more heard in planning, economic development, and transportation strategies made by other (public and private) actors outside the BID. The BID had earlier proven to be instrumental in establishing the Westside project in 2008 (a regeneration partnership of stakeholders in Birmingham-west), and the advantages of this partnership were emphasised in the BID2 proposal as well. These new activities were taken forward because the BID learned in previous rounds what it could deliver and because other stakeholders than the BID are not that active in addressing the challenges of Broad Street in relation to regeneration and connectivity (BID2 proposal, 2009; Interview BID manager, 2010). Although the process for re-ballot is structured along the prescribed BID legislation, the Broad Street BID again translated local, specific and new issues into the framework of the BID. Remarkable is that the BID tried to reach further than the initial controversy, and thus expanded its network, not only in organizational or geographical terms, but also strategically trying to expand its legitimacy, while keeping close to the local conditions at the same time.

5.2 Relating self-organization to vital actor relations in the regeneration process

On Broad Street Birmingham especially in the second round there were ongoing interactions between the various local stakeholders. The 2003 fight, ending round one, was the event that made the businesses and other actors on Broad Street aware of a joint problem, which was further defined in the second round. Boundary spanning work was done in order to look beyond the regular business activities, and co--production took place to find joint solutions. These were formalized by using the BID legislation as facilitating legal framework. As a consequence, the local businesses became leading and decisive in the process and the deliberations on Broad Street were furthered among a fixed group of actors represented in the BID Board during the third round. Again, the legal framework of the BID was facilitating this, and according to the BID legislation, both businesses, the BID board and the City Centre Partnership had to adapt to new roles. In the fourth round, the BID needed to renew its legitimacy by a re-ballot prescribed by the BID legislation. This demanded new interactions between local stakeholders to reassure and renew the BID strategy. Furthermore, connections were being made with other local stakeholders which were not part of the BID organisation, again boundary spanning work was done and potential new roles were explored. Although the deliberations on Broad Street started due to a conflict between different functions and users of the area, the process that emerged is characterized by vital actor relationships. There is a low level of conflict and high mutual understanding between the local stakeholders, which is symbolized by a positive re-ballot in 2010.

6.   Case comparison

Vital urban regeneration processes?
In the previous two sections we subsequently discussed and analyzed the two forms of self-organized behaviour and its impact on the vitality of the actor relations in the urban regeneration processes of both cases. In this section we explore similarities and differences between the cases.

Autopoietic and dissipative self-organization
In both cases we observed both manifestations of self-organisation, dissipative and autopoietic. We argue that this continuous interplay was important for creating and maintaining the vital actor relations, which made the local initiatives effective. At the same time new structures emerged in which local stakeholders got the room and responsibility to take the lead in the regeneration process.

Vital actor relations
When we take a closer look into the specific contribution that either dissipative or autopoietic self-organization made to the vitality of the actor-relations, specific differences between the cases become visible. In Caterham Barracks, the dissipative characteristics in the case are focused on connecting different actors and different spatial functions, in order to create a wide and diverse community related to the barracks. The people involved gradually became a more stable group because of a number of participants that remained turning up at meetings. The autopoietic characteristics were focused on consolidating ideas, delineating focus, formulating plans and finding organisational structure, in a rather converging manner towards a coherent development plan and the start of the Trust. On Broad Street, the dissipative characteristics in the case were rather focussed on pragmatic problem solving. Each time an existing problem was solved, a further challenge was found. Hence, instead of integrated vision building, a more ad-hoc and pragmatic way of working was followed. Homogeneity between the main actors, the businesses, has been important in creating vital actor relations. An explanation for this difference could be found in the object of the self-organization: at Broad Street the regeneration was about overcoming the controversy between conflicting functions in the area but keeping both functions, i.e. night time and day time economy, sustain, while in Caterham it was about the transformation of an area's meaning and establishing new functions in the area after the closing of the Barracks.

As described above, the interplay between dissipative and autopoietic system behaviour led to vital actor relationships, and eventually, to new governance structures in which local stakeholders took the lead in the urban regeneration process. At the same time, these emerging structures triggered autopoietic self-organization by themselves. This led to stability and progress, but is also a potential risk: the new emerging structures sometimes challenge already existing structures. For example, the democratic control of by the District Council concerning the developments in Caterham Barracks has significantly changed now. Also in the Birmingham case did the pre-existing City Centre Partnership adapt to a new role after the BID started to show off effects. A mutual adaptation of roles took place during the self-organized process: new governance structures emerge and old structures adapt.

In the case of Caterham the new structure of the Trust was capable of producing self-sustaining urban regeneration by running and facilitating community

managed facilities. In Caterham Baracks, community engagement was focused on outcome. Each round has explorative actions, but seemed to be rounded up by consolidation, delineation or selection. After each round a product was put forward as a result, and the final result is the creation of a new vision for the barracks, to be realised in the new development and creation of the Trust to keep the community as involved as they were in earlier rounds. However, connections between the Trust and the other actors (private developer, District Council and local community) became less vital in the last round. This autopoietic behaviour, endangering vital relationships with the community, could become problematic, for example in terms of legitimacy, which is a common issue for neighbourhood based initiatives (e.g. Chaskin and Garg, 1997).

In the Birmingham case, the BID proved to be an efficient vehicle for producing self-sustaining urban regeneration. However, the BID also excluded non-business actors such as local residents. On Broad Street, not so much a final goal like a plan or redevelopment was the leading idea, but the pragmatic solving of the 'problems of the day'. As these problems were originally legitimating the BID, the problems both needed to be solved and remembered at the same time. In the last round, when the BID had become rather successful, new and further challenges were found in order to maintain the legitimacy of the BID governance structure. The autopoietic characteristic of shutting out residents and solely focussing on businesses could be seen as a weakness in the light of inclusiveness and community involvement, but at the same time it is an element that makes the BID effective in solving the shared problems on Broad Street.

7.   Explanatory conditions

The goal of this research was to gain understanding of self-organizing processes in regenerating urban areas and to find conditions which favour these processes to emerge and to evolve into vital collaborations. In this section we describe four conditions which we found in both cases. These conditions are case driven.

1) Events threatening the identity of the area
In both cases dissipative behaviour is triggered by (external) events which had a disrupting effect on the meaning of the area for local stakeholders, i.e. the identity of the urban social system was threatened. In Birmingham the controversies between "drunks and bankers" were harming the reputation of the area. The death of a person triggered local businesses in cooperation with local authorities to take initiative. For the local stakeholders, this event strongly symbolized the conflicting functions of the area. In Caterham the closing of the Barracks triggered local community members to take initiative in a regeneration process. Although the Barracks were losing their function, they still had a strong historical, economical and social meaning for the local community. The threatening of the demolition of the buildings in order to build new houses triggered local stakeholders to protect the area and to transform it into a preservation site. Subsequently, local stakeholders prevented the demolition of the historical buildings of the Barracks and came up with the idea to reuse these buildings for community facilities. In Birmingham, the BID did not destruct the neighbourhood 'function' of the night-time economy, but developed new ways of managing this night time economy in such a way that it was not a controversy for the day-time economy anymore.

2) Boundary spanning work
In both cases we observed that key individuals were able to make connections between the different spheres (public, private and/or civic). In the literature, these connecting individuals are also known under the concept of boundary spanners (e.g. Alter and Hage, 1993; Williams, 2002). These boundary spanners not only connected actors operating in the different spheres, but also connected institutionalized structures to the emerging structures within the regeneration processes. In the case of Caterham the chairman of the Trust was important in creating relations between governmental institutions (the District Council and the District administration), the local community and the private developer. In Birmingham the BID Managers were important boundary spanners, especially in the second round, when the BID was initiated in the first place, but also in the fourth round, when it needed to renew its legitimacy again by the re-ballot. Then, new interactions emerged among local stakeholders in which the already existing BID partners sought and found communication and understanding with new content.

3) Mutual adaptation of roles
The emergence of new structures puts pressure on existing institutionalized structures. In both cases we observed a process of mutual adaptation of roles. In the Caterham case, the role of the local authority changed into facilitating instead of initiating or determining. In this way room is created for the self-organizing local stakeholders to take responsibility for the community facilities. Furthermore, the private developer adapted his way of working by taking a broader perspective on spatial development, including other spatial functions in its planning, by organizing a community planning weekend for the first time and by developing a S106 contract with the Local Group. On Broad Street too, mutual adaptation with regard to the emerging structure of the BID took place. The City Centre Partnership reorganised itself from a liaison between City Council and the Birmingham business community into a facilitating agency working for the Birmingham BIDs. Other local stakeholders, such as the police, City Council and residents accept the leading role of local businesses in the regeneration process. At the same time, the participating businesses in the BID were willing to extend their regular business activities with taking up certain responsibilities for the area. In both cases we observe that the succession of the emerging structures by the self-organizing local stakeholders' coincide with adaptation of institutionalized roles of other actors in the environment, which is also concluded in other case-studies of interactive or self-governance (e.g. Edelenbos, 2005; Edelenbos and Van Meerkerk, 2011).

4) Facilitating legal frameworks
In both cases enabling legal frameworks were used by the vigorous actor relations and facilitated the self-organization. In Caterham the S106 legislation obligated the private developer to invest in the local community. This framework has flexibility to be adapted to local circumstances. The S106 agreement was used as an innovative way to facilitate the Trust. Furthermore, the Trust model provided both the legal capacity as flexibility to facilitate community regeneration efforts. On Broad Street the BID legislation was used especially because it is prescriptive in procedures, but not on local conditions and themes. The legislation thus enabled businesses to find, and take forward the issues they regarded as important with their own means and responsibility.

8.   Conclusion

In this paper we explored and investigated the emergence of local initiatives in vital urban regeneration processes. We acknowledge that we only analyzed two cases in a specific country (UK), and therefore cannot provide generalized conclusions. However, we believe we found interesting insights from our two case comparative research. Using the concept of self-organization from complexity theory is helpful for analyzing how these local initiatives emerged, evolved and were able to consolidate. These self-organizing processes were not at forehand coined as regeneration processes but were a reaction to area identity threatening developments. Eventually, they evolved into, what could be approached as, urban regeneration. Vital actor relationships emerged in which the meaning of the areas for the local stakeholders evolved in such a way that it was connected with its historical roots, but also redefined in order to make it productive for a regeneration of the local community.

In both cases, the local initiatives led to new structures embedded in vital relationships between public, private and/or societal actors. The case analysis showed that there was a continuous interplay between autopoietic and dissipative system behaviour. Other scholars also stress this balance between these two manifestations of self-organization, characterized by the so-called 'edge of chaos' (e.g. Kauffman 1993; Merry, 1999) or situations of 'bounded instability' (Griffin et al., 1999). Our research empirically substantiates this theoretical assumption. We argue that this continuous interplay provided space for the new governance structures related to the local initiatives to evolve, but in connection with existing institutional structures and actors relevant with regard to the urban regeneration processes. In the emergence of this new dynamic equilibrium existing roles of involved actors changed. In both cases we observe a rather facilitating role of governmental organizations and a more integral focus of spatial development by private actors in connection with the local community. Furthermore, boundary spanners were highly important in connecting different parts of the system in a meaningful way, catalysing or initiating these processes of change. To maintain the vital actor relationships, continuous efforts are needed to keep interplay between autopoietic and dissipative behaviour.

Harnessing complex governance issues, such as urban regeneration, by the use of participatory arrangements is, in line with academic and practitioner discourses criticizing modernistic principles (Bond and Thompson-Fawcett, 2007), increasingly seen as a more effective and legitimate approach than conventional representative arrangements linked to hierarchical-instrumental policy making (see Wagenaar, 2007). In this light, self-organization driven by local stakeholders' initiatives is highly potential as it even goes one step further as it is community-based instead of government-led participation (see Boonstra and Boelens, 2011). However, consolidation of such initiatives does mean a challenge for existing structures for government, market and society that will need to adapt and change their roles to new governance realities. In this way self-organizing processes become meaningful in the regeneration of urban areas.

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