Art and Complexity in London's East End

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INTRODUCTION

David Ruelle [1] has argued that social systems lie beyond the possibilities of mathematical modelling, for the time being at least, and Kauffman [2] notes that cultural systems exhibit "signs of non-mysterious but emergent order." I want to explore the hypothesis that the basic tenets of complexity theory—adaptiveness, emergence, nonlinearity, and so forth—can function as effective tools of conceptualization that can usefully extend our understanding of the way certain urban areas evolve.

The story is of how the old manufacturing and dockland district of London, the East End, came over the course of three decades to have the highest concentration of artists in Europe, prompting the local authorities to rely in no small degree on the "creative industries" to contribute substantially to the regeneration of this run-down area.

PLAN OF THIS ARTICLE

This article draws on current empirical research and offers a tentative proposal for how we might bring complexity theory to bear on our understanding of this phenomenon. First of all, though, we take a brief look at the urban context and then at how the "creative industries" have been enlisted in the battle for the regeneration of urban areas. Next comes a history of the East End arts scene, which both tells the story of this phenomenon and teases out the underlying factors without which the story might never have been written. We then look at the few theoretical models that have been developed in an attempt to understand such urban areas.

The next section attempts to develop those theories through the introduction of complexity theory. First, it briefly sets out the methodologies utilized in this study and explains the route to the hypothesis that the East End arts scene might be conceptualized as a complex adaptive system. Six "indicators" for a complex adaptive system are then proposed, and each of them is tested against the available evidence. The article concludes that the East End arts scene can indeed be conceptualized as a complex adaptive system and briefly explores the implications of this in terms of policy and in terms of how one might develop a more formal theoretical model.

THE CREATIVE INDUSTRIES AS URBAN REGENERATORS

Since medieval times, the East End has been London's primary industrial district, but over the last half century or so, the advanced capitalist countries and the metropolitan areas within them have been transformed by global forces [3]. Areas such as the East End have found themselves increasingly beleaguered. For the first time

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in its urban history, it is not primarily an industrial area and has to find new ways of supporting itself.

But London is not unique in suffering from the changes within the global economy, nor is it unique in the fact that the creative industries—the visual arts, dance, theatre, cinema, and so forth—were perceived by policymakers as having the potential to regenerate the areas in decline [4]. However, it is unique in that while any "cultural renaissance" in other cities has been down to more-or-less systematic, policy-led exploitation of the cultural industries as a response to economic decline, that of the East End has its origins more deeply rooted in history and serendipity.

The cultural regeneration in these other cities, although a response to the same global forces of deindustrialization in the western world, has thus been of a "top-down" nature. In Bilbao, Spain, for example, pressure from church and voluntary groups in the light of a decline in the steel, shipbuilding, and chemical industries in the mid-1970s resulted in the Basque country's cultural heritage becoming a policy issue, which was enshrined in 1990 in a law on cultural heritage. Glasgow, Scotland, which had relied on heavy engineering for economic support, suffered badly with the loss of this underpinning, and only on the intervention of the Scottish Development Agency (SDA) in the early 1980s was a marketing policy introduced, which was reliant on sloganeering ("Glasgow's Miles Better") and events such as the 1988 Glasgow Garden Festival. Hamburg, Germany, the economy of which relied on ship building, has been the subject of policies that use the cultural industries as marketing tool, as has Liverpool, England [4].

In marked contrast to these places, the East End's growth as a cultural district has been of a "bottom-up" nature. This is important, for it plays a large part in determining how we go about understanding the creative milieu in terms of the East End. Initiatives of a "top-down" nature, such as those mentioned above in Bilbao, Hamburg, Liverpool, and Glasgow, would tend to suggest that the researcher should be examining how policy mechanisms are devised and applied. The bottom-up version, however, coming as it does from the grassroots, means that we have to examine those grassroots, along with the soil in which they have grown—an all together more difficult proposition.

THE HISTORY OF THE EAST END ARTISTS PHENOMENON

In the late 1960s, most artists in London worked from home, and the notion of many artists working together under one roof, even if in separate studios, was not one that had become common currency. London was and remains the artistic center for Great Britain. But among artists in the 1960s, there was something of an intellectual backlash against the notion of art works as commodities and against the dealer system, whereby artists rely on an art dealer to display, publicize, and sell their work for a percentage fee of the artwork's price [5]. Living/working accommodation had become relatively scarce in the established artistic quarters of the mid-1960s, at a time when the number of artists in London was increasing, and studio blocks simply did not exist. The significant point came in 1968 when St. Katharine's Dock, the first of London's docks to be closed, was converted into 100 artists' studios by a group of artists who enjoyed the tacit support of the Greater London Council (GLC). Wracked as ever by political infighting, the GLC was glad to clutch at any straw offering the hope of recovery from the unstoppable decline of London's industrial base, of which the docks were a significant part. And in grasping that straw, quite by accident, they laid the foundations for an agglomeration of artists in the East End.

The artists behind the St. Katharine's Dock initiative were driven by a combination of necessity and ideology, and they relied on the social networks of which they were already a part to further their aims [6]. The context in which they were operating was one of fluidity, in the sense that the changes in the system were driven by several contingent processes with no single goal in mind. Neither the property markets nor the policymakers knew what to do with redundant industrial buildings—they had, after all, never had to deal with this situation—and the art world was undergoing considerable upheaval in both the production and selling of art [5]. The artists were thus able to exploit this lack of clear direction for their own ends. Even so, they had to work within existing structures—setting up their own company, SPACE, for example—which meant that their idea would not founder on its own instability.

SPACE, then, was the first studio organization, but others soon followed. In the early 1970s, a small group of artists from Reading University came to London and, although they had heard of SPACE on the grapevine, they needed a place to live as well as to work [8]. The GLC was then embarking on a housing policy that encouraged housing associations—not-for-profit, privately run housing providers [9]. The Reading artists had heard from friends both of this policy and of "short-life" housing earmarked for demolition through slum-clearance programs. Therefore, they founded Acme Housing Association and took on short-life housing from the GLC, which they converted into live/work spaces for artists [8]. By the mid-1970s, word had spread among the arts community, and both SPACE and Acme were well established. Other warehouses on the banks of the River Thames had also been put to use as studios. In 1975, the first "Open Studios" event was held, whereby artists in East London opened their studios to the public for a few days. Acme and SPACE meanwhile, continued to grow. By that time, however, a process of gentrification had started, pushing up the value

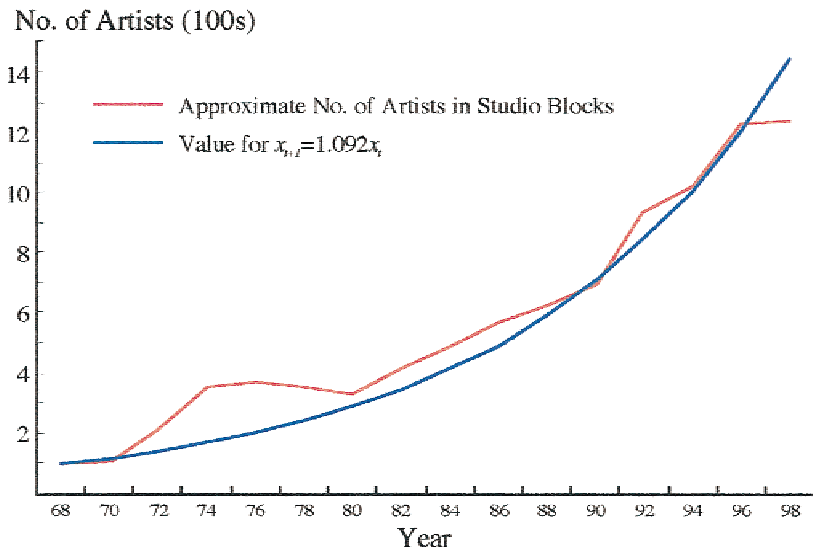
of housing that would previously have been demolished. Acme, effectively priced out of this market as the GLC began to claw back what were now assets, started to take on redundant light industrial space as well as short-life housing stock [8]. In 1980, the first "independent" studio block in the East End was established in a derelict veneer factory, rented cheaply from the local authority. Other groups of artists rapidly followed suit, establishing their own studio blocks in property that was predominantly light-industrial in origin, setting the pattern for the future. By the 1980s, the East End had a reputation as a place for artists and, like all good myths, it fed on itself and grew; the number of artists in the 30 km^2 or so that comprises the East End grew from 100 in 1968, to about 500 in 1980, to at least 2,000 in 1998 at current estimates (Figure 1). The greatest concentration of studio blocks in the East End is in the heart of what was, 60 years ago, the hub of London's furniture industry in premises of a scale ideally suited to the production of artwork [7].

By the mid-1990s then, the arts were seen and accepted as having the potential to act as a catalyst for urban regeneration, not just in the East End, but as we saw earlier, in other cities across Europe. And what everyone wanted to know was how these areas work.

HOW DO CITIES BECOME CREATIVE?

The phenomenon of the "innovative milieu . . . a place where synergy operates effectively to generate constant innovation, on the basis of a social organisation specific to the production complex located in that place" was explored by Castells and Hall [11], who sought to draw general lessons from the high-technology industrial concentrations typified by Silicon Valley, and by Saxenian [12], who sought to compare the high-technology industrial concentrations in Silicon Valley and Boston, Massachusetts. Although Saxenian and Castells and Hall were looking at technology-led regeneration, rather than "culture-led" regeneration, some of their conclusions are of relevance to the East End. First, they found no general formula by which successful technopoles could be contrived. Second, argued Castells and Hall, social networks are an essential "element in the generation of technological innovation, and the backbone of social organisation of any innovative milieu." Third, "technopoles are not built in a day" [11]. All three of these observations fit the East End comfortably. The networks that have developed have evolved over three decades, and it is only in the last few years that the local authorities have recognized the fact that the East End could benefit from this phenomenon. But what of those who have looked at creatively innovative milieux, rather than technologically innovative milieux?

FIGURE 1



Growth in the number of artists in studio blocks, 1968 to 1998. This graph excludes artists working from home or in single studios, for whom estimates are based on hearsay and vary from 500 to more than 2,000. The figures presented here were calculated by the author through archival research, by visits to the studio blocks themselves, where they were still functioning as artists' studios, and by interviews with those who occupied studio blocks that have since closed. The growth is roughly exponential, approximating to $x_{t+1} = 1.092\ x_t$ where x_{t+1} if the number of artists one year after x_t. The decline in numbers from 1974 to 1980 coincides with a rapid increase in the investment value of industrial property in the United Kingdom [27], although no causal connection had been established at the time of writing.

The problem is that there are few studies of creative milieux, and those that do exist tend to be historical studies. Hall [13] argues that art and culture "flourish in a special kind of city: one at the economic forefront, that consequently draws in talents, that is prepared to try new kinds of social relationships and new intellectual concepts." Creative cities, in Hall's view, are not comfortable places, but places of "great social and intellectual turbulence . . . a place where outsiders can enter and feel the state of ambiguity: they must either be excluded from opportunity, neither must they be so warmly embraced that the creative drive is lost." Here perhaps, in Hall's sightly oblique reference to a certain amount of disorder in the system, is the first sign that complexity theory might have something to contribute to our understanding of such phenomena. But there is another theory, of more direct relevance to the East End, that predates Hall's work.

Törnqvist [14] sought "certain common denominators discernible among such places as have witnessed a flurry of creative activity in the past." Törnqvist found his answers through studies of sites, both planned and unplanned, such as Silicon Valley and Sophia, Anti-

polis. He also drew on literature from geography, business economics, and information research, using his findings as the foundations for his hypotheses.

Törnqvist suggested that creativity could be seen as a kind of synergy and argued that a creative milieu requires four basic preconditions, which he lists hierarchically: information, knowledge, competence, and creativity. Founded on the three previous preconditions, creativity "requires a capacity for sifting information and combining knowledge and pieces of information in such a way that something new is created." This, for Törnqvist, is the root of a creative milieu's synergy since, although much of the process of creating something new takes place within the individual, people look to their surroundings—which includes people and places—as a catalyst.

Andersson and Sahlin [15] note that "very few systematic studies of macro-social conditions of creativity do exist," and although they make no reference to Törnqvist's 1983 study, they report findings substantially similar to Törnqvist's in a 1985 study by Andersson [16]. This study does not appear to add anything new to Törnqvist's findings, but does serve to confirm them.

The 19th-century French academic, Hippolyte Taine [17], who coined the notion of an artistic milieu, argued that it is not the milieu that creates the artists, but the artists who, already present, generate the "moral temperature" for certain kinds of talent to develop. This is a point that remains implicit in Törnqvist's theory, and perhaps Hall's "social and intellectual turbulence" is the moral temperature to which Hippolyte Taine refers.

More recently, Garnsey [18] has attempted to combine complexity theory with a systems analysis approach in an effort to elaborate on the evolutionary dynamics of high-technology industrial milieux. She argues that such milieux are aperiodic and unpredictable since, being sensitive to initial conditions, they are prone to both internal and external perturbations, and Allen [19] has noted that there is a need to explore spatial systems from an evolutionary standpoint.

And on the subject of gentrification, Smith [20] argues that the gentrification of an area can to an extent be explained in terms of the "rent gap"—the difference between the (hypothetical) rent achievable for the "highest and best use" of a property, and the actual rent achievable at that time. Gentrifiers are able to move into cheap property when the rent gap is large, but in so doing raise local property values, thus reducing the size of the rent gap and making the area more desirable to property developers. Zukin [21] argued along similar lines in *Loft Living,* her analysis of the conversion of Manhattan's light industrial property first to artists' studios, then to increasingly expensive dwellings in the 1970s and early 1980s.

These theoretical models are relevant to the East End. The East End satisfies Törnqvist's four preconditions, and it is somewhat disordered, as Hall predicts such an area might be. Garnsey argues that such a system is, of its nature, unpredictable. In the next section, then, we shall look in more detail at the artistic networks in the East End.

BRINGING COMPLEXITY INTO THE PICTURE

Thus far, we have relied on intuition and theoretical accounts of other similar areas to deduce that the East End arts scene might usefully be conceptualized in terms of complexity theory. As far as that goes, it is fine. But the question remains. For all that social systems are near impossible to model formally, might there be aspects that we can in some way measure, and which can offer further clues to support hypotheses deduced from a narrative history such as the one we have here?

The answer I think is yes. But before we go on, it is worth taking a brief look at the methodology for this project. Broadly, it is a combination of qualitative and quantitative techniques. The former takes the form of Grounded Theory developed from archival research and fieldwork comprising participant observation and in-depth interviews with artists' studio organizations, while the latter consists of formal social network analysis at an organizational level using data gathered in the same interviews.

Grounded Theory, as its name suggests, develops theory through systematic analysis of qualitative data gathered in the field. These data may be in the form of notes taken by an observer or, as in this case, from interview transcripts. "Coding" is carried out whereby the transcripts are scrutinized for references to themes that crop up relatively frequently. These themes can then be explored and hypotheses generated that can be subjected to testing through further research in an iterative process [22]. The possibility that the East End arts scene might be conceptualized as a complex adaptive system was one such hypothesis that arose during coding. The social network analysis (see Wasserman and Faust [23] for a general introduction) strongly suggested that the social networks were nested—networks within networks within networks—and this pointed to self-similarity at different scales. In other words, the networks appeared to demonstrate fractal properties, although the still-tentative nature of this proposition means that this is not an idea we shall be exploring further in this article.

Nonetheless, social network analysis can offer a snapshot of the dynamics of a social system at a given point in time, even if it does not fully address the evolutionary nature of such systems. However, it does offer an insight into the nature of the social connections and interactions that create the underlying dynamic, and from which, in combination with historical data and findings from fieldwork, we can generate further hypotheses.

Within the social network, five "indicators" for a complex adaptive system were, therefore, adopted. They are phase transition or an "edge of chaos" urban context, nonlinearity, sensitive dependence on initial conditions, adaptiveness, and emergence. We shall go through these one by one, testing each to establish whether the observations fit the hypothesis. In other words, can we detect these five indicators? We shall

then add the notion of the fitness landscape to our conceptual toolbox.

Is There Evidence for a Phase Transition?

At the time when artists started to move in to the East End, the area was going through an unprecedented shift in its economic base. The process of industrial decentralization, which had started in the 1930s, accelerated dramatically in the 1950s and 1960s, and at the same time, the volume of trade handled in the docks began a period of initially slow decline, but which from 1967, when St. Katharine's Docks closed, became a brutally rapid one [24]. In less than two decades, as the global shift from an industrial to a postindustrial economy played itself out locally, over two centuries of industrial activity was consigned to the scrap heap of history. All of London's docks closed in the space of just 14 years, from 1967 to 1981. London's manufacturing industries, like its docks, also experienced devastating changes: Employment in London fell from 4.3 million in 1961 to 3.5 million in 1989. Of the lost jobs, 800,000 were in manufacturing, while unemployment rose tenfold, from 40,000 in the mid 1960s to 400,000 in 1985 [13]. Local authorities found themselves powerless to halt the decline, even less to respond effectively to it, and willingly accepted any straws of hope that came their way. The context then was one of fluidity, in the sense defined earlier: "changes in a system driven by several contingent processes with no single goal in mind." However, the disorder was not total. In fact, I think it is reasonable to argue that the East End was undergoing the urban equivalent of a local phase transition, from industrial district to postindustrial district, and this is where we would expect a complex adaptive system to evolve.

Does the System Demonstrate Nonlinearity?

Nonlinearity is evident in the networks in the East End in the sense that all variables—artists, galleries, studios, schools—are, in way or another, dependent on one another. A fieldworker studying the networks, for example, might, by drawing one person's attention to someone else in the network with similar interests, be creating a linkage that did not previously exist, a linkage furthermore, the greater effects of which on the networks are not predictable.

The networks are also nonlinear in the sense that they are subject to positive feedback. As one interviewee put it, "it feeds on itself." This has been most apparent in the way in which knowledge that there are many artists in the East End has encouraged other artists to seek studio space in the area, a point that has come out strongly in interviews. However, this positive feedback is also expressed in the fact that the growth in the number of artists in the East End has been exponential (Figure 1).

Does the System Demonstrate Sensitive Dependence on Initial Conditions?

The behavior and evolutionary trajectory of the artists' networks are, to an extent, unpredictable and have to a considerable degree relied on contingency. Thus, the initial impetus for SPACE came when the two founder members, who had already wondered about the possibilities of establishing an "artists' community," noticed on the way home after having a drink with friends near the River Thames that St. Katharine's Dock was empty. And it was the need for somewhere to live as well as to work that led seven graduate artists from Reading to establish a housing association, Acme, in a pair of terraced 19th-century houses in the heart of the East End. SPACE offered only workspace, so was not an option. The result of this apparently small addition to requirements combined with a shambolic housing policy was to result, only a few years later, in streets of ex–short-life housing populated entirely by artists [8]. Both SPACE and Acme went from small experimental initiatives to large providers of studio space in a matter of months as they tapped hitherto unseen demand, laying the foundations for what would, two-and-a-half decades later, become the heart of the British arts scene. Acme is now the largest provider of studio space in the United Kingdom; SPACE, the second largest.

Is the System Adaptive?

We can take the hypothesis further still. Each of these artistic networks can also be conceptualized as a living organism with "limbs" and "minds." Each "mind" consists of a small, close-knit network of people who are gathering information from both within and without the network, processing this information, and using it to generate ideas, which are then turned into reality via the "limbs"—artists and schools, for example. The limbs might also function as contributors to the mind, and vice versa. The organism is thus capable of learning, of spontaneous self-organization, of adapting to its surroundings, and of growing, by shedding "dead wood"—those who lose interest in projects or who leave the area—and by taking on new people who wish to become involved.

This hypothesis, that the system is adaptive, is also demonstrated in the way that, as property markets have changed, artists have adapted. So Acme moved from short-life housing to light-industrial property in the late 1970s and early 1980s. And as SPACE and Acme came to be perceived as part of the establishment by younger artists, new "independent studios" were set up by new generations of artists, unconsciously using and contributing to the mechanisms described earlier and colonizing other parts of East London that had readily available cheap property that could be turned into studios.

Is the System Emergent?

If we accept the hypotheses that the artistic networks in the East End can be conceptualized as having a fractal structure and of exhibiting nonlinearity, sensitive dependence on initial conditions, and adaptiveness in their dynamics, then it follows that the artistic networks can be described as emergent. We have seen that they can learn, grow, and adapt. It thus seems reasonable to conclude that the artistic networks in

London's East End can be conceptualized as a complex adaptive system, evolving to suit its environment. And this, I think, is where the notion of the fitness landscape can be tentatively applied.

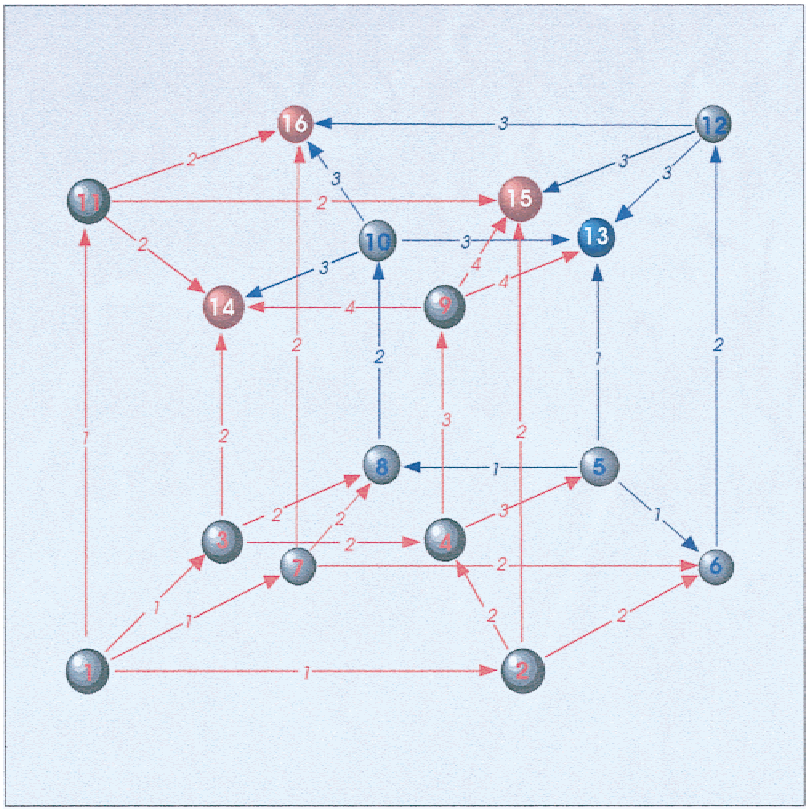
Fitness Landscapes

The notion of the fitness landscape was originally developed in the 1930s [25] and explored in terms of complexity theory by Kauffman [2] and, although not especially easy to apply, it does seem to be a potentially useful concept. First, we look at the example of St. Katharine's Dock and see how it might be applied descriptively to our situation. We then develop a more formal, general model.

In the St. Katharine's Dock scenario, 100 or so artists moved in to an area that was run down and derelict. The fitness landscape is favorable to the artists, who can climb relatively easily to a peak. Up to this point, however, the fitness landscape has been relatively unfavorable to property developers, for whom a derelict area is a difficult marketing proposition. But the artists have improved the fitness landscape for the property developers since the area is now imbued with an artistic focus, and the property developers move in, raising rents and altering the fitness landscape to such an extent that the artists can no longer survive in the area. So the artists leave, handing the area entirely over to the property developer. We can explore this at a more formal level with the help of Stuart Kauffman's (1995) evolutionary hypercube.

This four-dimensional hypercube (Figure 2) takes Kauffman's model of a fitness landscape and attempts to apply it to the evolutionary "conflict" between property developers, shown in red, and artists, shown in blue, in East London. Here, the numbers 1 to 16 represent progressively higher points in the landscape, and the height of a particular point on the fitness landscape will be dependent on and reflective of a number of factors, for instance, distance from the city center, proximity to public transport and other facilities, and so forth.

FIGURE 2



Four-dimensional Boolian hypercube, representing the changing fitness landscape for artists (blue) and property developers (red).

Three basic rules apply. First, it is possible only to climb higher, a "ratchet effect" reflecting the fact that newly gentrified areas rarely move "downmarket" once they have moved "upmarket." Second, the first actor to reach a point takes control of it and can use it to climb to a higher point. Third, those points on the landscape retained by either property developers or artists are those from which no further progress is possible. These represent local fitness peaks.

In this model, property developers start lower down the fitness landscape than do artists, since historically it has been artists who have paved the way for others to follow. In this respect, the initial fitness landscape, which in reality will probably comprise a cheap and run-down ex-industrial location with a poor reputation, is better suited to artists than property developers. Thus, property developers start from 1, artists from 5. Each arrow represents a step up the fitness landscape, and each arrow is numbered to denote the number of steps of each actor from their respective origins.

Thus, artists make rapid progress in their first three generations but climb through a relatively small part of the landscape to the lowest of the local fitness peaks, 13. Property developers, by contrast, are better equipped to deal with different aspects of the landscape—changes in the markets or media coverage making an area fashionable, for example—and so are able to climb the fitness landscape relatively quickly, encroaching frequently on territory first "colonized" by artists and winning three of the four local peaks, 14, 15, 16.

More formally, we can argue that the topography of the fitness landscape is a function of the local "rent gap." So the rent gap, g =

$r_{max} - r$, where r_{max} is the rent achievable for the "highest and best use" and r is the actual rent achievable at that time.

The fitness of an actor in this system is a function of the rent they can afford and the marginal utility they get from paying that rent. So, actor fitness $w = R \cdot u_m$, where R is the rent payable and u_m is the marginal utility (a figure between, say, 0 and 1) on that rent.

We combine (1) and (2) to get the fitness F_l of a particular actor to a specific locality, which may be defined as $F_l = w/g$.

An example: An old factory in an undesirable area is available for rent. Suppose that the rent achievable for its highest and best use is £20 per square foot and that the actual rent achievable at present is just £5 per square foot. The rent gap is thus £15. A group of artists seeking studio space can afford £5 per square foot, are pretty desperate for a place to work, and so do not mind too much if the area is insalubrious. In other words, the marginal utility for artists is high. We shall assign it the value of 1. Thus, the actor fitness of artists, w_a, is $1 \times 5 = 5$. For property developers, the situation is different. Although they can afford the going rent (and more), they do not want to develop in a run-down area with a poor reputation. The marginal utility for developers is therefore low, say 0.1, and the actor fitness of property developers, w_{pd} is $0.1 \times 5 = 0.5$. From these figures, we can derive the topography of the fitness landscape of artists and developers simply by dividing these figures by the rent gap, g, as noted earlier. If we were to derive a graph whose x- and z-axes enclose a map of a particular area, we could calculate local heights and draw a three-dimensional map of the actual "fitness landscape."

Although rudimentary, these models serve, with the support of the five indicators, as a useful first stab at developing a formal conceptualisation of the evolutionary dynamic of the East End arts scene. But of course the questions arises for us, as it does for the artists: Where do we go from here?

CONCLUDING REMARKS

We can show from empirical study that the artistic networks in London's East End exhibit all the properties of a complex adaptive system. In itself, that should come as no great surprise. Indeed, it would be somewhat astonishing to find a social system that was not a complex adaptive system. How then does this help our understanding of the artists' phenomenon in the East End?

The artistic networks in the East End appear to comprise a complex adaptive system that has inhabited localized fitness landscapes for as long as they were favorable, seeking out and moving to others when the local fitness landscape becomes unfavorable. And by purchasing property for use as studios, rather than renting it, networks are now seeking to mould their own fitness landscape, to make it less prone to the actions of others, that is, to make it less "rubbery."

So, we know that although the artists networks arose from fluid circumstances that lay largely outside the control of the local policymakers and have grown and evolved to suit the prevailing economic and political conditions of the time, they do nonetheless exhibit certain dynamic properties that we can describe at relatively formal level. In other words, the networks are not beyond our comprehension if we bring the right intellectual tools to bear. Conventional theory can bring us somewhat closer to an understanding. But it is to the sciences of complexity that we must look if we wish to find the key to this system and probably others like it.

Questions remain. We know why we need to improve our understanding of urban systems, and that is simply to give ourselves a better chance of making cities better places. We can make tentative predictions based on historical knowledge and intuition, but what policy initiatives should we adopt, given that these systems appear to be inherently unpredictable? Is there really any point in trying to predict what will happen? Well, yes and no. "No," if we decide that only perfectly accurate predictions are useful. But a definite "yes" if we accept that our predictions can and will be accurate only within certain limits. If, somehow, we can predict that certain events are more likely than others, and by how much, we have a useful policy tool.

So the future, I think, lies in the development of computer modelling techniques powerful enough to take into realistic account all the vagaries and contingent factors of an urban system. A first step perhaps might be to attempt to develop an agent-based model along the lines of those described recently by Casti [26]. This would model the evolution of the East End, say, over the half-century since the Second World War as it has moved from an industrial to a postindustrial district, and in so doing, enable a better understanding of the dynamics of an urban system as it is subjected to dramatic perturbations. Possibly we will not see much, but more likely, I suspect, is that shadowy patterns will emerge, patterns that are perhaps already recognizable to urban historians who have studied such places for years, developing deep intuitive understanding in the process, but having scant means of presenting their arguments as measurable fact, however articulate and persuasive they may be. Such a model would render these patterns more concrete. And in the East End of London we have, as we noted at the beginning of this article, a unique area that transmogrified in only three decades from the heart of London's industry to the crucible of its art. This area has taught us much already. It has much to teach us still.

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