

# Jane Jacobs as Spontaneous Economic Order Methodologist: Part 2: Metaphors and Methods

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I have shown that into every act of knowing there enters a passionate contribution of the person knowing what is being known, and that this coefficient is no mere imperfection but a vital component of his knowledge.

—Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy* (1958, p. v)

Any human settlement is an economic equivalent to a local ecosystem. Just as ecology is the economy of nature.

—Jane Jacobs, interview by Stewart Brand (1998, n.p.)

**Abstract:** Jane Jacobs, both the person and her work, appear to be trending upward on the academic interest scale, particularly in the year marking the centenary of Jacobs' birth. Although most researchers are still drawn to her writings on urban spaces and their human interactions, a few have begun to discuss her economic insights, and others yet have published comprehensive biographies. Interest in the inductive methodology Jacobs used to generate her ideas, and in the organized complexity paradigm that shaped her work and worldview, however, has been sparse because of their apparent lack of scientific rigour. This paper, the second of two connected works in which we explore both the development and the full fruition of Jacobs as spontaneous economic order theorist and methodologist, discusses her use of metaphor and inductive methods as tools firmly in, and of, the current philosophical understanding of acceptable research methods in the social sciences. In addition to positioning Jacobs' methods within the realm of the philosophy of science, we also examine her research strategies and discuss the critical reception of the theoretical and methodological aspects of her work.

**Keywords:** Jane Jacobs, spontaneous order, induction, inductive reasoning, Jacobs spillovers, organized complexity

## JACOBS' USE OF LIFE SCIENCE METAPHORS

### Methodological Breakthrough: Organized Complexity Metaphors

As Jane Jacobs readily acknowledged, her outlook was profoundly influenced by students of the natural world who had long ago rejected the Enlightenment's view that nature "seeks standardization, uniformity, universality, immuta-

bility" and observed instead that it is "a force forever hostile to uniformity, a force that insists upon diversity. Thus today we think of standardization, and immutability... as being literally unnatural" (Jacobs 1980, p. 113). Indeed, Jacobs added, evolutionary biologists "tend to equate goodness with the correlation between unconstrained smallness and innovation and the sheer exuberant diversity of life" (idem). To her, the parallels with urbanized economic life

were obvious and she made it her goal to uncover striking similarities between “the root processes at work... in human and natural ecologies” (Jacobs 1984, p. 224).

The drive to explain the processes at work in urban ecosystems by harnessing such insights dated back to Jacobs’ first encounters with the sciences: “From the time of her science courses at Columbia, Jacobs followed scientific developments in such emerging fields as genetics, cybernetics, and complexity science, which enabled her to argue that concepts and research methodologies familiar to the life sciences could be applied to cities” (Laurence 2016, p. 54). As Laurence (*idem*) argued,

[d]iscoveries in the biological sciences, which revealed the complex workings of biological systems, helped to corroborate her belief that fully functioning cities cannot be spontaneously generated from utopian and artistic desires.[...] In *Death and Life*, she thus compared the ‘immense and brilliant progress’ made in the life sciences between the 1930s and the 1950s to the stultification of the ‘pseudoscience’ of city planning during the same period with intellectual conviction, not just rhetorical bluster.

Exposing parallels between natural and human ecosystems became Jacobs’ most enduring paradigm, stemming from the conviction that the sciences had the right tools and the right mental models to illuminate the complexity of human organization: “[...] cities had to be considered a part of nature, functioning like other natural and living systems” (Laurence 2016, p. 54).

In *The Nature of Economies* Jacobs argued that both thriving biological systems and healthy economies share four common characteristics: (1) development (either differentiations emerging from within generalities or differentiations becoming new generalities from which further differentiations then emerge); (2) expansion (quantitative change); (3) self-maintenance through “self-refueling;” and (4) evading collapse (i.e., constant self-correction) (Jacobs 2000). When economist Sanford Ikeda asked her what she thought her most important contribution to economic theory was, Jacobs answered “the discovery of the fractal” (Ikeda 2006b, p. 21; see also Jacobs 2004b). Fractals show the same patterns at all scales; Ikeda, an Austrian school economist, interpreted what Jacobs said to mean “the same kinds of emergent forces and complex network relations that support dynamic neighborhoods appear again at the

level of the city, the region, and ultimately on a global scale” (2006b, p. 21).

### The City as Organized Complexity in Life Sciences

Although she already referred to herself as a “city naturalist” in 1940, the key passages to understand Jacobs’ overall paradigm and transition to theorist are to be found in her *Death and Life* (1961) chapter titled “The Kind of Problem a City Is” in which she summarized and expanded upon the former Rockefeller Foundation Vice-President for the Natural and Medical Sciences program Warren Weaver’s (1948) classic essay “Science and Complexity.”<sup>21</sup> Jacobs’ pivotal chapter contains eleven mentions of Weaver, including ample paraphrases and citations. Jacobs set the stage for Weaver’s insights by writing about the role of a philosophy of mind and a philosophy of science: “the mental methods we can use for probing the world [...] methods of analysis and discovery that had gotten into human brains: new strategies for thinking. These have developed mainly as methods of science. But the mental awakenings and intellectual daring they represent are gradually beginning to affect other kinds of inquiry, too” (Jacobs 1961, p. 428). With these new methods of analysis, “the very nature of some puzzles are no longer what they once seemed” (Jacobs 1961, p. 429).



Warren Weaver

**Figure 1: Warren Weaver (1894-1978).**

Source: Rees 1987, p. 492.

Having set the stage, Jacobs (1961, 429) introduced Weaver’s work:

To understand what these changes in strategies of thought have to do with cities, it is necessary to understand a little about the history of scientific thought. A splendid summary and interpretation of this history is included in an essay on science and complexity in the 1958 *Annual Report of the Rockefeller Foundation*, written by Dr. Warren Weaver [...]. I shall quote from this essay at some length because what Dr. Weaver says has direct pertinence to thought about cities. His

remarks sum up, in an oblique way, virtually the intellectual history of city planning.

Next, Jacobs recounted the three stages of development in the history of scientific thought Weaver had identified based on the type of problems scientists had learned to tackle. First were problems of simplicity that contained two factors directly related to each other in their behavior, such as gas pressure and volume. After 1900, physical scientists developed statistical methods to tackle problems of “disorganized complexity” that involved millions or even billions of variables where systems as a whole, rather than each unique variable, possess certain orderly and analyzable average properties. Examples of this type include the motions of stars, behavior of atoms, or the properties of telephone exchanges. Jacobs wrote: “The life sciences, such as biology and medicine, could not be [probed by this method of analysis {based upon statistical ideas}], as Dr. Weaver points out. [...] the life sciences were neither problems of simplicity nor problems of disorganized complexity; they inherently posed still a different kind of problem, a kind of problem for which methods of attack were still very backward as recently as 1932, says Dr. Weaver” (Jacobs 1961, p. 431).

A third set of problems was later identified between these two extremes in which a moderate number of variables were interrelated. First discussed in the context of the life sciences, such problems included the description of aging in biochemical terms, or why salt water fails to satisfy thirst. As Weaver put it: “These problems, as contrasted with the disorganized situations with which statistics can cope, *show the essential feature of organization...* they are not problems of disorganized complexity, to which statistical methods hold the key. They are all problems which involve dealing simultaneously with a *sizable number of factors which are interrelated into an organic whole*” (quoted by Jacobs 1961, p. 432).

Jacobs’ chapter title was derived from Weaver’s identification of organized complexity as a class of problems, exactly the “kind of problem” (Jacobs 1961, p. 431) to which the dynamics of urban interactions belonged. To Jacobs, the elaboration of urban interactions as a “kind” or class of problem was extremely important as she further first paraphrased, then quoted Weaver:

In 1932, when the life sciences were just at the threshold of developing effective analytical methods for handling organized complexity, it was speculated, Dr.

Weaver tells us, that if the life sciences could make significant progress in such problems, ‘then there might be opportunities to extend these new techniques, if only by helpful analogy, into vast areas of the behavioral and social sciences (Jacobs 1961, p. 432).

With this, Jacobs was, in effect, establishing the theoretical basis for her study of cities. She was, in parallel with Weaver’s text, laying down the foundation for studying urban interactions as scientifically as biologists studied insect colonies or marine ecosystems. “[I]f only by helpful analogy” (idem), Jacobs was ushering in a new era of thinking about cities as a vastly new and more interesting class of problem, more dynamic than economic equilibrium theories and more unpredictable than the behavior of *Homo economicus*, yet still “capable of being understood, instead of considering them, as Dr. Weaver puts it, to be in ‘some dark and foreboding way, irrational’” (Jacobs 1961, p. 433).

Having established a scientific basis for the study of cities via Weaver’s work, Jacobs then sketched out her foundational metaphor:

Cities happen to be problems in organized complexity, like the life sciences. They present “situations in which a half-dozen or even several dozen quantities are all varying simultaneously *and in subtly interconnected ways.*” Cities, again like the life sciences, do not exhibit *one* problem in organized complexity, which if understood explains all. They can be analyzed into many such problems or segments which, as is the case of the life sciences, are also related with one another. The variables are many, but they are not helter-skelter; they are “interrelated into an organic whole.” (Jacobs 1961, 433, original emphasis)

Jacobs indicated she understood the limitations of her foundational metaphor of a city as an instance of organized complexity, as found in the life sciences, with organically interrelated problems:

Because the life sciences and cities happen to pose the same kinds of problems does not mean they are the same problems. The organizations of living protoplasm and the organizations of living people and enterprises cannot go under the same microscopes. However, the tactics for understanding both are similar in the sense that both depend on microscopic or

detailed view, so to speak, rather than on the less detailed, naked-eye view suitable for viewing problems of simplicity or the remote telescopic view suitable for viewing problems of disorganized complexity. (Jacobs 1961, p. 439)

Jacobs argued that the same paradigm could be used to study both *classes* of systems. Metaphors derived from the study of one system could be applied as a scaffold to shore up the basic structure of another. There was, however, a limit to what such a scaffold could do. As we will see, Jacobs used metaphors to establish her models; she turned to other methodological tools to probe and refine those models' inner structure and logic.

### Is Metaphor a Valid Method?

The importance of metaphor in framing inquiries in the sciences is clearly articulated through the critical realist stance on the nature of mental modeling. Jacobs' desire to expose, study and understand the mechanisms responsible for the observable phenomena, mechanisms she believed to exist independently of herself, made her a scientist in the critical realist sense of that word (Lewis 1996).<sup>2</sup> Lewis (1996) explained the process of building insights about unfamiliar topics—"reference fixing"—by introducing the concept of the generative metaphor: "A generative metaphor is not merely an ornate expression of similarities and analogies its author was already aware of, but is the *source* of new perceptions of similarity and analogy, picking out similarities and analogies that were unknown until the metaphor pointed them out and thereby brought them to the author's attention" (Lewis 1996, p. 493, original emphasis). Indeed, Jacobs seemed to regard the *cities as organized complexity in the life sciences* metaphor as a generative metaphor allowing her to apply a suite of new approaches to the study of this as yet unexamined problem. Lewis further noted that:

Generative metaphor enables the scientist tentatively to attribute, independent of any prior understanding of the unobservables, relations of similarity and analogy between those inadequately understood entities, mechanisms, etc., and the subject matter of some better-understood domain of scientific inquiry, so that knowledge about the latter can be used to structure an understanding of the former. (Lewis 1996, p. 493)

This is where, however, a generative metaphor may have proven too heavy-handed for Jacobs, and why, perhaps, we

do not see her build a complex set of metaphors resembling a theoretical system. Instead, Jacobs turned to a different set of tools.

Jacobs wrote: "Why reason inductively? Because to reason, instead, from generalizations ultimately drives us into absurdities" (1961, p. 441). Attributing too many aspects of a previous system or entity to a new and unknown system or entity, "independent of any prior understanding" (Lewis 1996, p. 493), may just have been too much of a generalization to Jacobs. If "knowledge about the latter can be used to structure an understanding of the former" (idem), how much of that prior knowledge may obscure or prejudice the understanding of the unique, the non-obvious, yet essential, qualities of the new entity under study? Kanigel (2016, p. 326) excerpted a letter Jacobs wrote to Stewart Brand<sup>3</sup> in 1994 about the kinds of evidence one may encounter: "solid statistical evidence," "random, highly suspect anecdotal evidence," and "systematically illuminating cases." We hypothesize that to Jacobs, Lewis' "prior understanding" from an overextended generative metaphor may have thus got in the way of discriminating between "random, highly suspect anecdotal evidence" and "systematically illuminating cases."

Jacobs wrote about the frustration of trying to understand the relationships governing a system by looking for patterns, testing, over and over, and refuting any that emerged: "I don't like all this confusion. I only keep at it because, hard and uncomfortable though it is, it is worse to stay in such confusion" (Letter: March 18, 1985, quoted in Keeley 1989, pp. 34-35; also reprinted in Allen, 1997, pp. 206-7). This would suggest, however, that the ambiguity of a general metaphor, and not an extended generative metaphor, might have been all that Jacobs needed to establish the epistemic feedback loop completed by her use of induction. Perhaps what Jacobs told Stewart Brand in her 1998 *Whole Earth Catalog* interview may help us see how far Jacobs wanted to take a metaphor: "Any human settlement is an economic equivalent to a local ecosystem. Just as ecology is the economy of nature. [...] You can't prescribe for a global economy any more than you can get a handle on prescribing for a global ecosystem. Also, if you get too abstract about these things they become meaningless" (Brand 1998, n.p.). In any case, Lewis' explication of metaphor as a tool of scientific paradigm building fully situates Jacobs' use of it within modern scientific method. The assertion of critical realism of an "objective" reality outside the observer aligns with the objective value of experience as postulated by Polanyi, which we will see in an upcoming section. It

may be in fact argued that Lewis' reference fixing—a way to gain an epistemic foothold in an intellectually uncharted territory—is very much like Polany's personal knowledge construction. In science, Lewis (1996) stated, knowledge construction starts with the metaphor, and that is also where Jacobs initiated her sense-making. In her early work she used different ecological metaphors (slippage, mutation, floating, feeders) for the patterns she would elaborate upon in later works such as *The Economy of Cities*, but her overall outlook always remained grounded in the vocabulary of the life sciences: evolutionary and dynamic.

## LIFE SCIENCE METAPHORS: CRITICAL ANALYSIS

It would appear that Jacobs' use of metaphor was generally judicious as two serious drawbacks have always constrained the sustained application of biological metaphors to the study of economic development. The first is that evolution involves no intentionality toward a specific goal, whereas economic development is driven by the satisfaction of human wants. The second is that, with the exception of the smallest levels of complexity (such as genes and microbes), different biological species do not interbreed, while human beings produce new things by relentlessly recombining artifacts, skills and ideas, including the genes of different animal species. So while Jacobs (2000) arguably has a point in observing that growing economies, like complex ecosystems, are “dynamically stable” inasmuch as they can evade collapse by self-correction through the grace of bifurcations, positive-feedback loops, negative-feedback controls, and emergency adaptations, there is arguably a limit to how far one can stretch such analogies.

Like previous writers on economic development who went down the life science path, Jacobs couldn't avoid some long-standing pitfalls. One such problem is that economic development is the result of individuals trying to solve problems affecting them by combining heterogeneous facts, ideas, faculties, and skills on a scale that is unparalleled in the rest of nature. In this context, what about the imprint of historical experience on human consciousness, intentionality and combinations for the purpose of creating new artifacts in nature? As one of Jacobs' (2000) characters pointed out in a book written in a dialogue format, one should not infer cooperation (or interdependence) when plants or animals don't know they are cooperating. To this objection, another discussant gave the example of a Botswana honey bird that enrolls honey badgers<sup>4</sup> and human beings by guid-

ing them to a hive in the expectation that they will share the fruit of their capture. But can we truly speak of intentionality when species exhibit only one kind of interdependent behavior? And while beavers mix mud and logs to create dams, can they be said to generate development as opposed to simple quantitative expansion (or growth)? While a life science perspective has its advantages, it also exhibits some limits.

Laurence (2009, p. 363) argued that Weaver's essay “galvanized Jacobs' thoughts about the complexity of the city and provided the theoretical conclusion for the sequential and cumulative observations which [she] had described in the preceding chapters... Weaver's science, however, only proved what Jacobs already knew—“that a city could not be designed like a building or a work of art” (idem). Few early commentators, however, have explicitly discussed Jacobs' work in the context of organized complexity, although some, like prominent Canadian regional development scholar Gerald Hodge (1970, p. 134), had observed that “[r]eaders of *Death and Life* will remember a remarkable chapter called “The Kind of a Problem a City Is,” which should be required reading for all urban professionals.” One other exception is the economic thought journalist David Warsh (1984, pp. 23-24) who observed in his book *The Idea of Economic Complexity* that, more than any other, “it is Jane Jacobs who has illuminated issues of economic complexity in a graceful and penetrating way over a long career” and that “attention to the range of interactions in cities, the diversity of skills and products, and the dominating metabolism of export and import are characteristic of Jacobs' vivid approach.”

The individuals who arguably took Jacobs' methodological stance most seriously are the disciples of the Canadian Jesuit philosopher and theologian Bernard Lonergan (1904-1984). Lonergan's most influential book, *Insight: A Study of Human Understanding*, was first published in 1957 and argued, among other things, that “grasping the intelligible in the concrete and the sensible is what allows us to get from particular cases to general principles and from universal theories and laws back to particular cases intelligently” (quoted in Lawrence 1989, iii).<sup>5</sup> Because of her fondness for the work and approach to education of these individuals, Jacobs eventually donated her papers and other memorabilia to their academic base of Boston College in 1995. Another thinker with whom Jacobs shared some affinities as to complex system and spontaneous social orders is Friedrich A. Hayek, but while the latter was an admirer of her work, Jacobs was not aware of his as she was laying

the foundations to her study of economic life (Callahan and Ikeda 2014; Staley 1989).

Of course, Jacobs was hardly the first writer to use biological and ecological metaphors or to focus on processes and change in the study of both cities and economic development. Indeed, a survey of such work would have to range at least from the urban ecological models of the first generation of the Chicago School sociologists in the early twentieth century (Lutters and Ackerman 1996) to a large number of economists belonging to almost all schools of thought over more than a century (Hodgson 1998). The appeal of such an approach is obvious. Since the most significant processes in the “natural” and “anthropological” realms characteristically exhibit increasing complexity, acceleration through time, and irreversibility, individuals who observed those aspects of reality noted that evolutionary biology should prove a more fruitful source of inspiration for economic development theorists than classical Newtonian mechanics. Mainstream economists, however, had little use for such notions and typically assumed unrealistic conditions such as exogenous technological change, equilibrium (or the absence of entrepreneurial behavior to disrupt it) and optimization. Through her adoption of an evolutionary framework, Jacobs could bypass all this and focus instead on entrepreneurship, technological change and increased diversification over time, processes that, through their dynamic natures, fit poorly into the standard static models of economic analysis.

The common threads in all of Jacobs’ main books are the benefits inherent to (dense) diversity and unmasking how decentralized and self-generating development processes relentlessly promote ever more diversity over time. For instance, she observed that the “[g]enuine, rich diversity of the built environment is always the product of many, many different minds, and at its richest is also the product of different periods of time with their different aims and fashion. Diversity is a small souls phenomenon. It requires collections of little plans” (Jacobs 1981, p. 249).

Mary Rowe (2014 p. 26) compiled a list of “Jacobs’ Principles” which, when grouped into interrelated clusters, progress from interaction through generation and into the scalable patterns that sum them up:

Autonomy  
Informal  
Self-regulating  
Non-prescriptive

Generative  
Bottom-up  
Density  
Social Capital  
Diversity  
Particularities and Differences

Patterns of Interaction: Networks  
Feedback loops  
Organized complexity  
Fractals

From the point of view of urban economy (Storring 2014), these principles may be rearranged and grouped as follows:

1. Eyes on the Street
2. Social Capital
3. Generators of Diversity:
  - a. Mixed Uses
  - b. Aged Buildings
  - c. Small Blocks
  - d. Population Density
4. Form still Follows Function
5. Local Economies
6. Innovation
7. Make Many Little Plans
8. Gradual Money
9. Cities as Organized Complexity
10. Citizen Science

Indeed, these themes would be so pervasive in her work that Jacobs felt “she had been writing the same book, over and over” (Rowe 2014, p. 23).

#### The Kind of Method Induction Is

As Cichello (1989 p. 118) observed, one of the most hotly contested issues in the philosophy of science has always been “how one determines just what is a ‘sufficient’ frequency or regularity, and just how this sufficiency relates to validity,” a question obviously at the heart of many debates on what conclusions can one draw from inductivist approaches. Another known problem of induction is C. S. Peirce’s problem of reliably determining plausible, not just possible, rules (Holland, Holyoak, Nisbett and Thagard 1989). Jacobs’ use of inductive strategies prompted commentators such as Manshel (2010 n.p.) to write that she produced “overblown pronouncements and unprovable theories,” and had a “tendency toward sweeping conclusions based on anecdotal in-

formation,” methodological criticisms that reveal as much about the state of an educated person’s understanding of the aims and limits of science as they do about said (hypothetical) person’s ability to stomach ideas both simultaneously non-ideological (or incompatible with one’s perspective) and unsettlingly iconoclastic. To pry at least the former of these away from the molten core of outrage at Jacobs’ “unprovable theories”, one needs to reach back in time to the foundations of the philosophy of science for a recapitulation of some of its recent transitions.

### **Hierarchy vs. Complexity: Legacies of Mechanism**

Computer science and philosophy scholar Andrei Sorin in his treatise on knowledge construction, *Software and Mind* (2013), built on the work by E. J. Dijkserhuis and Richard Westfall, among others, to illuminate the need to understand and support non-mechanistic methods against the still prevalent mechanistic interpretations of reality. Sorin (2013) wrote that mechanistic approaches combined the insights of earlier Greek atomism with the newer reductionism to arrive at a picture of the world in which all processes, systems and entities could, and should, be disassembled into their constituent parts. These, in turn, would be studied dispassionately one by one, and independently of each other, before being reassembled to give a fully characterized picture of the world. While psychologically satisfying for the practitioners, the mechanistic approach has limiting flaws: “[R]eductionism and atomism are valid only for *independent* [Sorin’s emphasis] phenomena; that is, when the lower-level phenomena can be isolated and studied separately” (Sorin 2013, p. 80). Most systems or phenomena in the life sciences and the social sciences, instead, show a great degree of interdependence between their elements and sub-processes, as Jacobs noted while reflecting on Weaver’s article.

The key conceptual and foundational assumption of mechanism is: “to understand a phenomenon means to be able to represent it with a hierarchical structure” (Sorin 2013, p. 89). This is important to us as it highlights the interdependence between the mechanistic worldview and the understanding of all knowledge as intrinsically hierarchical. Adding new knowledge to a hierarchical knowledge structure may prove problematic: Not only does each new piece of information need to be placed on the right level of the hierarchy, but also, and more to the point, each new piece of information may challenge the hierarchy. Thus, while the mechanistic paradigm does well with systems that are static or lacking complexity, complex dynamic sys-

tems will, by their nature, disrupt a hierarchy that oversimplifies too many of their processes and negates the spatial and temporal interdependence between different “levels”. A hierarchical and atomistic paradigm, in addition, also supports another tenet of mechanistic and Cartesian approaches to science: the preservation of impersonal detachment from the object of observation. Even though we have not yet addressed detachment and objectivity, they will become significant shortly.

Now that we have sketched out the strengths and weaknesses of the mechanistic paradigm of science, we need to establish that this paradigm dominated the sciences and the social sciences when Jacobs’ work first started gaining notice. Next, we will have to connect non-mechanistic methods to the study of complexity, and complexity to induction. Sorin’s work (2013) can help on both counts, first in establishing that non-mechanistic approaches are defined by their ability to account for and accommodate complexity, finally in realizing that mechanistic dogma still permeates the structures of the sciences and the social sciences almost sixty years after Weaver wrote so eloquently about the problems of organized complexity. For help with understanding the nature of scientific knowledge, and for help with evaluating Jacobs’ research methods, we will eventually turn to Michael Polanyi and, finally, to Karl Popper.

### **Last Stop for Hierarchy: Abduction**

Before we analyze inductive thinking as an antidote to mechanistic assumption-building, let us visit one more methodological alternative to induction. C. S. Peirce identified abduction as a method for generating hypotheses by determining which explanation best fits the known facts (Holland et al. 1989). Abduction differs from a generalization in that it attempts to produce an explanation, not just summarize known facts. As Holland et al. explained (1989, p. 89), “[a]bduction will often require search through the default hierarchy of relevant concepts to find the most appropriate explanatory hypothesis.” Since abduction plays a role in the generation and verification of scientific theories (Holland et al. 1989), one could argue that Jacobs may have been convinced she was using induction but was instead picking from known alternatives abductively. Hacking (2001) further muddied the differences between induction and abduction by noting that both were “risky” hypothesis-generation methods based on experience.

No one can assert with certainty that what is happening inside another person’s mind is adequately communicated by that individual’s conscious and unconscious expres-

sions. One may perhaps approximate that reality by analyzing a sufficiently large or sufficiently meaningful sample of that person's documented output. Setting aside Jacobs' own (1961, pp. 440-441) discussion of her use of induction, which we will shortly examine, how else can we recognize and label her mental processes?

Jacobs readily embraced metaphor, as we have shown, but she rarely used the kind of generative metaphors requiring multiple inferences and assumptions through which she would define an entire system in terms of, or analogously to, something else. Instead, Jacobs chose open-ended metaphors that gave her access to tools and methods rather than sets of facts, as we may remember from *Death and Life*: "The organizations of living protoplasm and the organizations of living people and enterprises cannot go under the same microscopes. However, the *tactics* for understanding both are similar" (Jacobs 1961, p. 439, our emphasis)

This observation, and statements like it, particularly in her landmark *Death and Life* (Jacobs 1961, pp. 428-468) methodological chapter provide a sampling of Jacobs' outlook on the kinds of metaphors and inferences with which she was comfortable at the time when she was first coming to grips with them. As stated earlier in a letter she wrote about her methods, she tried to come to the issues she analyzed with very few preconceptions and no real sense of directions as to the evidence she should examine:

When I start exploring some subject, I hardly know what I think. I'm just trying to learn anything I can about it. Rather than reading systematically, which is possible only if you know what you want, I read as omnivorously as I can manage, in anything that interests me. I often don't even know why I'm interested in some facet or other, and all I can say about that is that from experience I've learned to trust myself when I'm interested. (Letter: March 18, 1985, quoted in Keeley 1989, pp. 34-35; also reprinted in Allen 1997, pp. 206-7).

It is important to notice Jacobs' confirmation she did not try to fit any of her initial observations to known models as that kind of systematic ordering "is possible only if you know what you want" (*idem*). Further, Jacobs admitted she found, as she researched, that her idea of what was central to her, or what, indeed, was her purpose, shifted as she continued collecting observations:

As I read, and also notice things concretely, patterns from this information begin to form in my mind. Also, I learn that what I thought originally was "the subject" is not necessarily the subject, or is only an alley or sideshoot of it—that there is a lot else to it, or underneath it. So I make outlines as I go along, but they keep changing, and what I end with bears little relation—or relation in very small part—to what I was starting with, I thought. Very messy. (Letter: March 18, 1985, quoted in Keeley 1989, pp. 34-35; also reprinted in Allen 1997, pp. 206-7).

Jacobs, thus, did not appear to navigate a hierarchy of best-known solutions that fit her data, as she would do if she reasoned abductively. She instead allowed herself to dwell in the "very messy" realm of emerging patterns, knowing full well that even their early categorizations ("outlines") will be changing throughout as more data is gathered. Jacobs' descriptions of her work methods convey her awareness of her own discomfort with the unknowns she was facing, hinting at a tension between a facile resolution, which abduction might have brought her, and her ultimate, and uncomfortable, response of slogging through the unknown until the patterns emerged and could be tested. Her statement "[w]hen I start exploring some subject, I hardly know what I think" (*idem*) coupled with her admission that she often ended up in a very different place from the one where she started may perhaps help us put aside the (reasonable) idea that Jacobs classified her early observations according to some abductive schema of *a priori* hypotheses. Aside from her guiding metaphor of city as organized complexity as observed in the life sciences, which encouraged her to carry out close and detailed observations of various city dynamics, Jacobs appears to have approached her work with her mind a *tabula rasa*.

Now that we have investigated Jacobs' metaphors, their relationship to her methods, and a certain affirmation of her methods as inductive rather than abductive, let us examine the nature of personal observation, its relationship to induction, and the place of induction among the methods of science and social science.

#### **"Passionate Contribution": The New Nature of Knowledge**

Let us return to the problem of organized complexity and the insufficiency of mechanistic reasoning in dealing with the analysis of complex problems. The philosopher Michael Polanyi has written extensively about the creation and accumulation of new knowledge, and, what is just as impor-

tant to us, about what it means to “know” in the sciences. In fact, his 1958 book *Personal Knowledge: Towards a Post-Critical Philosophy* addressed the crisis brought about by the perception that subjectivity would destroy scientific objectivity, and, along with it, “proper” scientific knowledge. Polanyi (1958, p. iv) set out to confront this issue directly: “I start by rejecting the ideal of scientific detachment. In the exact sciences, this false ideal is perhaps harmless, for it is in fact disregarded there by scientists. But we shall see that it exercises a destructive influence in biology, psychology and sociology, and falsifies our whole outlook far beyond the domain of science.” Polanyi followed his rejection of detachment with the indictment of the mechanistic idea of a detached and modular knowledge in favour of an understanding of knowledge as a conscious act of personal commitment (*idem*). Knowing something, Polanyi posited, is vitally dependent on the individual involved in the act of knowing making a new connection, now accessible to others—thus not subjective—yet initially obscured, a connection that does depend on that individual’s context, experience, choices and awareness (Polanyi 1958, pp. iv-v, original emphasis):

[T]rue knowledge is deemed impersonal, universally established, objective. [...] I regard knowing as an active comprehension of the things known, an action that requires skill. [...] Such is the *personal participation* of the knower in all acts of understanding. But this does not make our understanding *subjective*. Comprehension is neither an arbitrary act nor a passive experience, but a responsible act claiming universal validity. Such knowing is indeed *objective* in the sense of establishing contact with a hidden reality; a contact that is defined as the condition for anticipating an indeterminate range of yet unknown (and perhaps yet inconceivable) true implications. It seems reasonable to describe this fusion of the personal and the objective as Personal Knowledge. Personal knowledge is an intellectual commitment [...].

Before we go on, let us pause and reflect on the implications of Polanyi’s reconceptualization of the act of knowledge on the legitimization of Jacobs’ methods.

Manshel (2010, n.p.) accused Jacobs of having a “tendency toward sweeping conclusions based on anecdotal information.” Harris (2011, p. 72) argued that Jacobs’ “published works lacks anything that might reasonably be construed as a test or even a methodical demonstration of facts.” For

instance, there is no evidence of “any systematic attempt to observe the sidewalk ballet on Hudson Street at different times of day or days of the week” or that Jacobs “considered trying to trace the long-term fate of paired samples of specialized, as opposed to diversified, cities.” More recently, Lev Bratishenko (2016) described Jacobs’ methods as antiquated, amateurish, sowing prejudice and disinformation:

Her speciality was the induction of rules from patterns discovered by individual observation, like a 19th-century gentleman scientist. Her work gave seriousness to reactions that might otherwise be dismissed as taste, ignorance or prejudice. [...] [S]he seems not to have doubted the objectivity of her observations. [...] She wrote that there were three kinds of evidence: ‘solid statistical evidence,’ ‘random, highly suspect anecdotal evidence,’ and ‘specifically illuminating cases.’ If you agree with the conclusions then the anecdote is illuminating, and if you do not, it is just random. When confronted with the obvious problems of this kind of cherry-picking, her famous retort was, ‘Darwin didn’t have data either.’ (Bratishenko 2016, n.p.)

Manshel, Harris and Bratishenko are, in fact, bearing witness to Sorin’s (2013, p. 14) observation that we “[...] are trained to think mechanistically, and are expected to pursue only mechanistic ideas, regardless of whether these ideas are useful or not. Moreover, non-mechanistic ideas are dismissed as ‘unscientific,’ even if shown to be useful.” Manshel, Harris, Bratishenko and other critics, more than fifty years after the publication of Polanyi’s *Personal Knowledge*, rejected Jacobs’ ideas for lack of rigour. They did so because her ideas were formulated through her engaged observation and targeted expertise, as well as her full intellectual commitment to the systematic use of the inductive method in discovering bottom-up processes, but without recourse to the mechanistic sloughing off of complexity and context. If we are to accept Polanyi’s and Sorin’s insights, had Jacobs eschewed “illuminating cases,” “anecdotal information” and “sweeping conclusions,” the novelty and incisiveness of her observations may have been lost altogether in a decontextualized and detached footnote to some generalized processes that may or may not apply elsewhere. Chances are, however, Jacobs would have missed her insights as she could not have developed them without a deep personal engagement with her subject.

While Polanyi’s explanation of knowledge as an intellectual commitment bearing witness to a deeper, objective

reality is elegant, it is also powerful and moving. Polanyi, like Jacobs, realized that theories not rooted in life are sterile (Polanyi 1958, p. v): “I have shown that into every act of knowing there enters a passionate contribution of the person knowing what is being known, and that this coefficient is no mere imperfection but a vital component of his knowledge.” In this manner, to the horror and puzzlement of many critics, Jacobs was the key “coefficient,” if not the multiplier, of her insights.

Polanyi wrote his indictment of the consequences of the mechanistic approach to knowledge before Jacobs published *The Death and Life of Great American Cities* (1961), yet the two works are close enough in publication date that ideas from Polanyi’s field of philosophy may not have diffused into Jacobs’ sphere, regardless of how voraciously and widely she read.<sup>6</sup> Jacobs does not cite or mention Polanyi in *The Death and Life* (1961) so it is fair to assume she was not sufficiently aware of his work to have her thinking challenged or inspired by his ideas. As an aside, we had asked both Jim Jacobs<sup>7</sup> and Lawrence Solomon,<sup>8</sup> two of Jacobs’ long-standing collaborators and “human resources,” to comment on any writers or thinkers that may have influenced Jane Jacobs or may have gained her notice over the years. Both men articulated a similar response that could be distilled to seeing Jacobs read constantly and widely without ever seeming to concentrate on a particular thinker or school of thought, with the possible exception of Adam Smith.<sup>9</sup> It was as if Jacobs always looked for raw data while systematically filtering out the interpretations of others that could colour her hypothesis construction.

### Induction: “The Scandal of Philosophy”

Induction or inductive inference have been discussed by philosophers of science since the time of Plato and Aristotle, and have continued to be analyzed by Bacon, J.S. Mill, Hume, Kant and others (Popper 1962). As many philosophers, including Polanyi (1958) have noted, inductive reasoning, by proceeding from examples to generalizations, may be used to find not just new hypotheses but also confirmations for pseudoscientific theories because it cannot help to verify any statement’s ultimate adherence to reality. Thus, “the problem of induction,” also known as the “scandal of philosophy,” has become the scandal of psychology and artificial intelligence as well” (Holland et al. 1989, p. 1). First, we will introduce more definitions and examples of induction; next, we will explore the notion of induction as a scandal in science and philosophy. Finally, we will show

how Jacobs worked inductively, according to the principles and patterns we are about to expose.

Induction may be loosely defined as the bottom-up process of hypothesis generation based on an extensive examination of data (Bernard 2000). Glaser and Strauss (1967) characterized inductivist methodologies influentially in their grounded theory approach. Their process is illustrated in Figure 2. Over the years, other inductivist methods such as the “literal replication” approach in which “the researcher makes case selection expecting similar results from a series of cases” or else analyzing contrasting cases presenting mostly similar characteristics save an important one (Hirt 2012, p. 43; see also Yin 1984) have emerged. Bernard (2000) surveyed the most widely used inductivist methods in the social sciences. These were updated by Cresswell (2007) and included narrative analysis, phenomenology, and the grounded theory / content analysis feedback loop, which we will revisit shortly. These types of analysis vary in the types of problems they are most suited to, the units of analysis (such as individuals, groups, cohorts), and the focus of intended outcome. Cresswell (2007, p. 78) described phenomenology, for example, as dealing with the “essence of a lived phenomenon.” Phenomenology, narrative research and grounded theory with content analysis have been used in disciplines ranging from psychology and education to anthropology and sociology. These are, of course, the complex disciplines of life sciences and social sciences where Jacobs, along with Weaver, first noted the absurdity of using mechanistic research approaches.

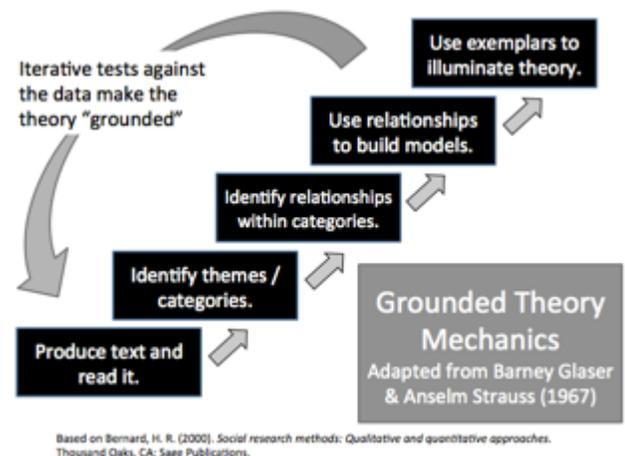


Figure 2: How Grounded Theory Works.

Source: Bernard (2000). Adaptation: Szurmak.

Two things are evident from this lightning tour of inductivist methods. The first of these is the shift in the focus, and a corresponding shift in the shame, of the updated definition of induction. Instead of seeing induction as the regrettable starting point of all theories in the abyss of the particulars, modern induction theories see the method as “encompass[ing] all inferential processes that expand knowledge in the face of uncertainty” (Holland et al. 1989, p. 1). Beakley and Ludlow (2006, p. 101) described inductive methods as “context dependent and guided by prior knowledge,” processes that let one “learn from experience.” Bayesian decision theories, behaviorist psychology and artificial intelligence still bear little resemblance to how people think, but they have made constructing messy hypotheses from complex data more acceptable and, indeed, more elegant. Insertion of new knowledge has been a problem to many of those systems, although the Bayesian algorithms are getting increasingly better at this, as shown by Alexandridis (2006, p. 20), who stated outright that “inductive approaches are more appropriate for studying complex system dynamics, patterns of non-linearity and non-monotonic systemic behavior, and for study of cognitive and learning mechanisms of human inference.” It seems that by the second half of the 2000s the shame of induction dissipated into the fame of Bayesian analysis and algorithmic complexity.

We seem to have dismissed the scandal of induction by showing that by the beginning of the 21<sup>st</sup> century new fields, and new analytical approaches such as Bayesian analysis, had opened research up to induction. While this appears to stand up to reality, we don’t have to settle for the social acceptance hypothesis of the spread of inductive methods in the sciences. For centuries, the stigma of induction derived from it being the primary method for hypothesis and theory generation while also being called on for verification. How can an inexact bottom-up approach stand up to the rigors of science, especially if it cannot affirm the truth of a statement or a system? Let’s examine the answers by taking another excursion into the philosophy of science.

### **Karl Popper: Demarcation, Falsifiability and the Perfect Synergy**

In his 1935 work *Logik der Forschung*, translated into English in 1969 as *The Logic of Scientific Discovery*, Karl Popper said this about induction: “Now in my view there is no such thing as induction. Thus inference to theories, from singular statements which are ‘verified by experience’ (whatever that may mean), is logically inadmissible” (Popper 1969, p. 18). After apparently trashing the method,

Popper went back to it because of the need to find an acceptable way of disposing of the scandal, which had the effrontery of persisting after Popper slew the beast. Simply put, scientists went on using induction while admitting it was unscientific to use it. Situating induction within the realm of scientific inquiry led Popper (1989) to examine the relationship between experience and objectivity in science. Both of these contributions are vital to our exposition of Jacobs’ methods as scientifically sound. We will start with Popper’s solution to the induction scandal, which will eventually show us why and how the modern uses of induction fit in with science, and Jacobs’ methods fit in with them.

Popper approached the scandal of induction by developing a solution to the problem of demarcation, or reliably distinguishing between science and pseudoscience. Popper (1969, p. 18) stated that:

Theories are, therefore, never empirically verifiable. If we wish to avoid the positivist’s mistake of eliminating, by our criterion of demarcation, the theoretical systems of natural science, then we must choose a criterion which allows us to admit to the domain of empirical science even statements which cannot be verified. But I shall certainly admit a system as empirical or scientific only if it is capable of being tested by experience. These considerations suggest that not the verifiability but the falsifiability of a system is to be taken as a criterion of demarcation. In other words: I shall not require of a scientific system that it shall be capable of being singled out, once and for all, in a positive sense; but I shall require that its logical form shall be such that it can be singled out, by means of empirical tests, in a negative sense: it must be possible for an empirical scientific system to be refuted by experience.

In order to be able to accommodate the life sciences and the social sciences (“natural science”: Popper 1969, p. 18) within the realm of scientific analysis, we must be able to work with hypotheses encompassing complexity, messiness and uncertainty (“statements which cannot be verified”, idem). This is not a problem, in his view, because theories cannot be “verified” or conclusively proven, anyway. What makes a scientific theory or system viable? In order to be scientific, Popper required a hypothesis, theory or system to be capable of being refuted by experience. He bolstered his statement with the following: “Now I hold that scientific theories are never fully justifiable or verifiable, but that they

are nevertheless testable. I shall therefore say that the objectivity of scientific statements lies in the fact that they can be inter-subjectively tested” (Popper 1969, p. 22). Sorin (2013, pp. 213-214, 215) summarized Popper’s later thinking on induction:

What Popper proposes is to combine the methods of induction, which are indispensable for discovering new theories but cannot prove them, with the methods of *deduction*, which cannot create new knowledge but *can* prove statements. [...] The first thing we learn from Popper’s discovery is how absurd is the popular belief that we must *verify* our theories, that we must search for *confirming* evidence. For, no matter how many confirmations we find, these efforts can prove nothing. Rather than attempting to show that a theory is valid, we must attempt to show that it is *invalid*; and the theory will be accepted as long as we *fail* in these attempts. It will be accepted, not because we proved its truth (which is impossible), but because we failed to prove its falsity. Thus, if we sincerely attempt to refute our theories, if we agree to accept only those that pass the most severe tests we can design, our knowledge at any point in time is guaranteed to be as close to the truth as we can get. (Sorin’s emphasis)

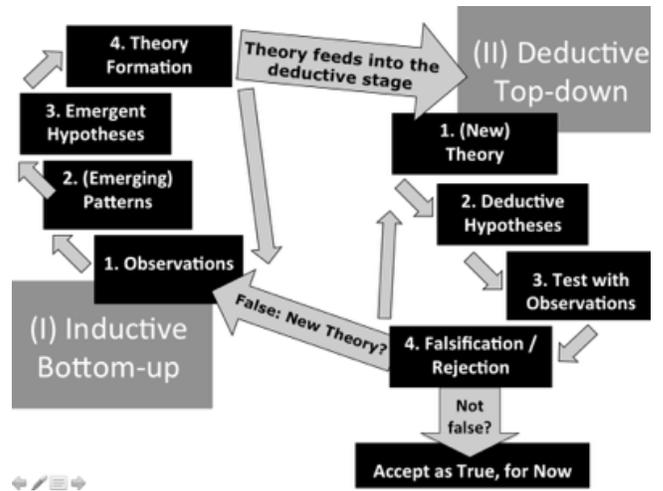
Popper (1962; 1989) and Sorin (2013) have thus shown us what constitutes scientific inquiry: Inductively constructing theories based on observations, then attempting to refute them through a deductive process. We will soon show that Jacobs did, in fact, inductively construct theories she then attempted to refute via a deductive process. While doing so, she got as close to the truth of scientific inquiry of cities as she could.

**Grounded Theory and the Induction / Deduction Loop**

Popper himself, starting with *The Logic of Scientific Discovery*, but even more so in the 1962 to 1989 (5<sup>th</sup> ed.) follow-ups of *Conjectures and Refutations: The Growth of Scientific Knowledge*, affirmed the need for induction to work with deductive reasoning in order to develop theories that can be both based on reality, and testable.

Getting back to the recent research work in the field, social science has certainly embraced the Popperian reconceptualization of the role of induction. The *modus operandi*, now widely practiced, is the grounded theory / content analysis loop as described by Bernard (2000) and based on Glaser’s and Strauss’ work (1967). Bernard (2000),

Creswell (2007) and others have included inductive methods as part of a bipartite data analysis and hypothesis testing system. In Figure 3 we have illustrated this feedback loop of inductive theory generation leading to a deductive top-down theory hashing that uses falsifiability, not verification, as the mechanism of (temporary) theory acceptance. The cycle is ready for endless refinements, and induction is never used as the mechanism for the verification or, indeed, the falsification of a hypothesis. Induction is the generative side of the feedback loop. On the testing side, one progresses deductively from a theory to further hypotheses, and one attempts their falsification. This is where induction has quietly found its niche while the debates about the absurdity of an inductive basis for scientific observation have died down. As we will show, this is also how Jacobs appears to have worked, gathering observations in the ways, and on a scale, commensurate with the kind of a problem a city is, and testing her hypotheses precisely the way Popper had demanded that she do, by trying to refute her own ideas, over and over again.



**Figure 3: The Feedback Loop between Inductive Theory Generation and Deductive Theory Testing.**

Illustration: Szurmak.

**The Jacobs Coup: Objectivity AND Falsifiability**

While dealing with Popper’s derivation of the correct logical place of induction in scientific theory formation, we also encountered his definition of objectivity. As a parting theoretical shot, we will compare Polanyi’s and Popper’s views on objectivity, reaffirming Jacobs’ adherence to them, while

reminding ourselves that objectivity was also affirmed in the critical realist analysis by Lewis (1996). Polanyi (1958, pp. iv-v) wrote: “Personal knowledge is an intellectual commitment, and as such inherently hazardous. Only affirmations that could be false can be said to convey objective knowledge of this kind.” Since Jacobs worked to refute her theories, we do know that she was able to convey objective knowledge, in Polanyi’s sense of that term, to which she had made a passionate intellectual commitment. Popper (1969, p. 22) added a broader understanding of objectivity, one that Jacobs could be seen to strive for, and achieve:

My use of the terms ‘objective’ and ‘subjective’ is not unlike Kant’s. He uses the word ‘objective’ to indicate that scientific knowledge should be justifiable, independently of anybody’s whim: a justification is ‘objective’ if in principle it can be tested and understood by anybody. If something is valid’, he writes, ‘for anybody in possession of his reason, then its grounds are objective and sufficient.’

Jacobs endeavoured to make her assertions testable and falsifiable, and, above all, understandable by any reader of her accessible books. Even though her hypotheses may have relied on diverse and seemingly “unscientific” source materials ranging from news clippings to personal unstructured observations, they remained objective as long as they could be “tested and understood by anybody.”

### Jacobs’ Practice of Induction

Building on Weaver’s essay and her own experience, Jacobs made the case for the inductive approach before Popper’s reconceptualization, and long before grounded theory methods became widespread. Problems of organized complexity, she argued, could not be dealt with satisfactorily through the economists’ and most social scientists’ deductive and statistical methods. Jacobs (1984, p. 206) further suggested that “history does not repeat itself in details, but patterns of economic history are so repetitious as to suggest they are almost laws.” The best way to go about uncovering them, she suggested, was

1. To think about processes;
2. To work inductively, reasoning from particulars to the general, rather than the reverse;
3. To seek “unaverage” clues involving very small quantities, which reveal the way larger and more

“average” quantities are operating.  
(Jacobs 1961, p. 440).

If Jacobs insisted that the very essence of cities dictated the study of processes and their catalysts, why did she advocate the inductive method? Because, as she put it (Jacobs 1961, p. 441), “to reason, instead, from generalizations ultimately drives us into absurdities.”

One can surmise that her experience with the urban planning profession had convinced her that deductive reasoning was more likely to result in the adaptation of inadequate analogies and metaphors that, once entrenched, would prove difficult to identify, correct and discard.<sup>10</sup> As she would tell Kunstler (2001) decades later, architects and public officials could justify their behavior to her “because urban renewal was a greater good, so they would bear witness for this greater good. Why was this a greater good? Everybody knew it because slums are bad. But this isn’t a slum... They didn’t care how things worked anymore. That was part of it... Also they didn’t seem to care what part truth and untruths had in these things.” In Jacobs’ (1961, p. 441) words, people trained in deductive thinking “frequently seem to be less well equipped intellectually for respecting and understanding particulars” than people untrained in expertise, but possessing relevant local knowledge.

As she further argued:

Inductive reasoning is just as important for identifying, understanding and constructively using the forces and processes that actually are relevant to cities, and therefore are not nonsensical. I have generalized about these forces and processes considerably, but let no one be misled into believing that these generalizations can be used routinely to declare what the particulars, in this or that place, *ought* to mean. City processes in real life are too complex to be routine, too particularized for application as abstractions. They are always made up of interactions among unique combination of particulars, and there is no substitute for knowledge of the particulars (Jacobs 1961, p. 441).

Why then seek “unaverage” clues involving small quantities? Because statistics typically told very little about how the quantities are working in systems of organized complexity. What one needs instead are “pinpoint clues” that are often “the only announcers of the way various large quantities are behaving, or failing to behave, in combination with each other” (Jacobs 1961, p. 443). These “pinpoint

clues” were connected to “specifically illuminating cases” in that both involved an unapologetic and intimate knowledge of the phenomena under study, not any generalizations or approximations.

Jacobs would further expand on her method through the voice of her character Kate’s explanation of how she went about looking for moral syndromes in her 1992 book *Systems of Survival*:

First, I immured myself in the library, opening to closing. Read, read, read, and took notes... Hit and miss at first, but sharpened as I went along. Biographies; business histories; scandals, sociology, although that was less help than I expected,<sup>11</sup> except for some of the Europeans. I dipped into general history and... skimmed some cultural anthropology. Nights at home I clipped newspapers. I drew on three kinds of evidence. Whenever I ran across behavior that was extolled as admirable, I cast it in the form of a precept... I should emphasize, though, that not one of these precepts is here because it turned up as a unique or even a rare instance. Every one showed up over and over, in varying contexts...

Precepts I first drew from one of my three kinds of evidence were reinforced when they turned up, as they did more often than not, in one or both of the other kinds of evidence I used... when I repeatedly ran across evidence for a precept, I included it regardless of any preconceptions I had... In the haste imposed on me, I may have missed important precepts, but I doubt it, because the time arrived when I wasn’t catching new fish, just netting repetitions. Then I holed up at home and tried to make sense of my notes. (Jacobs 1992, pp. 25-27)

Repeatedly, as we pointed out in the section where we rejected abduction as Jacobs’ methodology, Jacobs refused to honor any preconceptions, working instead with the data and whatever emergent hypotheses they manifested. As is obvious from her various books, the range of evidence she built upon is often staggering. For instance, in *Systems of Survival* (1992) she discussed English youth gangs, the pre-historic cultures of India, the Third World debt crisis along with the influence of the Italian mobsters in Canada, the customs of East African tribes, and her father-in-law’s stint as a military doctor in the American Civil War. In *The Nature of Economies* (2000) she freely borrowed ideas and insights from biology, evolutionary theory, ecology, geol-

ogy, meteorology, anthropology, history, political science, economics, and other disciplines. And throughout it all, she assiduously read daily newspapers such as the *Wall Street Journal* and Toronto’s *Globe and Mail*. In the end, though, perhaps the most telling comment on her research method was made by her husband who guesstimated that she tossed out “about 87 percent of her ideas into the wastepaper basket” (quoted in Allen 1997, p. 14).

And so it came to be that having honed her theory building skills in the research and writing of *Death and Life*, Jacobs unleashed her method on issues of urban economic development and stagnation after observing that there were no agreed-upon patterns to explain them. Consistent with her approach, she commented in a 1967 speech that she didn’t know “where to begin,” but observation soon suggested the hypothesis that “a city that is not stagnating economically is a city that is continually casting forth new kinds of economic activity” (Jacobs 1967 in Allen 1997, p. 91). From this insight followed a series of questions, such as “Why do some cities produce these new things?” and “Why are some cities creative only for a time, and then halt?” She then decided that perhaps the best way to shed some light on these problems was to learn more about the history of successful businesses “in the hope that some patterns of what was important would emerge” (idem). They soon did, and reading business histories (many of which were at first taken from the pages of *Fortune*)<sup>12</sup> soon became tiresome as it amounted to “reading the same three historical novels over and over and over again” (idem.). As she put it:

The characters wore different clothing and had different accoutrements around them, at different periods, but they were the same old three stories. As these were American business histories, I wondered if this was quite special to us, and decided to try a different place and time. What better place than London, in medieval times. Luckily for me, I read the wonderful account, written at the turn of the century by George Unwin, of the guilds and companies of economic importance in Tudor and Stuart times. There, sure enough, were the same three plots. I looked further afield; Japan, Russia and China seemed to have the same three plots. I have not yet found a fourth. It may very well be there, but I have not found it (idem.).

The key insight she derived from her research was “that new economic activities come out of the internal economies of cities.” The way she derived the insight was, once again,

by interrogating the data and looking for refutation of hypotheses in different contexts.

When Jacobs worked with source materials and observations, she was arriving at hypotheses that were based on these inputs inductively. Once she had refined hypotheses into theories, she no longer turned to induction for testing. Jim Jacobs offered a description of his mother's method that identified it as inductive in the generative phase, and relentlessly deductive in the testing phase: "Jane tended to reject her work and rewrite it when she spotted contradictions with the evidence, be it what she had been reading, what she knew [...]. Construct a hypothesis bubbling up from the evidence and test it repeatedly against the data to find contradictions. Jane always looked for contradiction, not confirmation."<sup>13</sup> Decades before either Popper (1989) or Bernard (2000) fully described it, Jacobs was using the research method at the heart of the inductive/deductive synergy. Jim Jacobs further confirmed Jacobs' facility with the method, noting that finding the contradiction would help her focus on the aspects of her work that needed refining, always keeping in mind the need to find an explanation, a mechanism at the root of what she observed:

She was aware of the difference between correlation versus cause and effect, and of the potential separation in time between cause and effect. She searched for the underlying mechanism that could connect events in a causal way; next, she tested the mechanism over and over again, particularly to establish its consistency and recurrence over historic time periods. Validity of the mechanism would be confirmed by its recurrence in different places and at different times.<sup>14</sup>

Despite the evidence showing Jacobs' use of induction as ground-breaking and, in fact, predating the use of inductive / deductive feedback loops in the social sciences, we still need to address criticisms of Jacobs' data collection and working habits. After all, how can one do research without a lab, research staff, or even a research plan? Jacobs may not have had a lab, but using the whole city as real-time experiment, and getting occasional help from family, colleagues and friends, she definitely had a research plan and a strict regime she followed for all but her last book.<sup>15</sup> She also had a habit of keeping her efforts modestly under wraps, disguising rather than emphasizing the wide-ranging data collection and the endless trial and error of hypothesis construction:

If I wanted, I could go on and on, but that would only be tiresome and repetitive and perhaps self-indulgent in displaying my industriousness and labor! I go in for a different type of self-indulgence. While I'm not an artist, I do feel bound to try, as far as I'm able, to produce a work of art as well as a piece of truth—and one thing about a work of art is that it conceals, rather than parades, the laboriousness that went into it which was, after all, nothing but the work in its service. (Letter: March 18, 1985, quoted in Keeley, 1989, 34-35; also reprinted in Allen 1997, pp. 206-7).

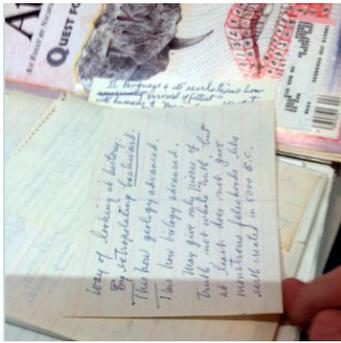
Because of criticisms of Jacobs' method, we made a point of asking her colleagues, collaborators and close family members who watched and facilitated her work to reflect on her methods. Their descriptions spoke of a disciplined researcher who carefully constructed her arguments before writing them down, and then relentlessly revised and tested them in an effort to disprove them.<sup>16</sup> Indeed, in his brief two-day visit to the Jacobs' archives one of us (Desrochers) came across a not insignificant amount of case material that never made it to her books. Both of us also had a chance to examine some files that Jacobs used to sort her clippings (shown in image 4) and see the wealth of handwritten observations and notes on pieces of paper, index cards, or directly on sources, as shown in images 5 and 6.<sup>17</sup> These folders and annotated sources bore witness to much analysis, classification, re-classification and re-purposing of source materials, as well as the repeated handling and reuse of sources. Jacobs did appear to expend a significant amount of time and intellectual capital on the acquisition, analysis and storage of her source material, showing a systematic scholars' attention to the processes of research.



**Figure 4: File Folders Jacobs Used to Classify and Store Information.**

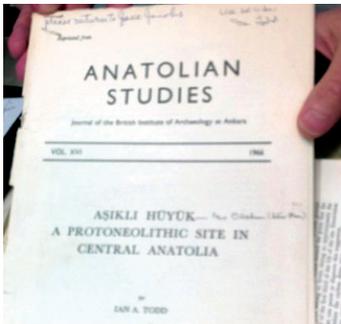
Source: Authors' Interview with Jim Jacobs, March 26, 2016.

Photo: Szurmak.



**Figure 5: An Annotated Magazine Article from a Jacobs Folder.**

Source: Authors' Interview with Jim Jacobs, March 26, 2016. Photo: Szurmak.



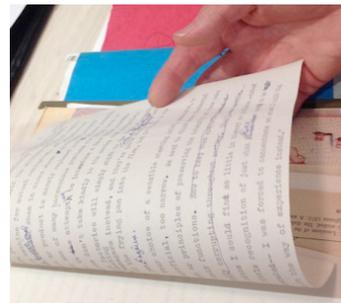
**Figure 6: An Annotated Journal Article Reprint from a Jacobs Folder.**

Source: Authors' Interview with Jim Jacobs, March 26, 2016. Photo: Szurmak.

As witnessed repeatedly, and recounted by both her son Jim<sup>18</sup> and Energy Probe collaborator Lawrence Solomon,<sup>19</sup> Jacobs had a work process to which she adhered tightly and which she had refined, and used, starting with *The Death and Life of Great American Cities*, through all her books except for *Dark Age Ahead*<sup>20</sup>. The workflow Jacobs followed could be summarized as follows:

1. Gather information:
  - a. Read widely, including books, articles, magazine stories and newspapers such as *The Wall Street Journal*.<sup>21</sup>
  - b. Observe: "Jane said: Just look. Jane walked and looked. That was *Death and Life of Great American Cities*."<sup>22</sup>
2. Strategize entire chapters in her mind before writing anything.<sup>23</sup>
3. Transfer material from her brain to the page by typing it out fluently on a manual typewriter, not a word processor.<sup>24</sup>
4. Interrogate her work by reading it to herself and arguing back at herself to find contradictions with the evidence.<sup>25</sup>
5. Revise (in pen on typescript, as evident in Figure 7) or throw out pages that didn't meet the contradiction test.<sup>26</sup>
6. Rewrite.
7. Again, interrogate against the evidence to eliminate dissonance and contradictions between theories and facts by tweaking theories.
8. Go back to Step 5.<sup>27</sup>

Jacobs adhered to the inductive generation/deductive testing methodology through every stage of her writing, revising repeatedly and rejecting anything that could be falsified.



**Image 7: An Annotated Typescript Page from a Jacobs Folder.**

Source: Authors' Interview with Jim Jacobs, March 26, 2016. Photo: Szurmak.

In addition to her family and colleagues, Jacobs had methodological supporters among her critics. Cichello (1989, p. 158), for one, observed her work closely, suggesting, in the same year that Popper published his inductive/deductive method synthesis, that Jacobs' research method was authentically inductive, with a rigorous deductive testing process:

she is more concerned with grounding statistical data within the underlying intelligibility of the process that they measure, than with statistics for their own sake. She moves from specific and particular observations to general laws and theories, which she in turn is able to apply to other specific situations. Her work is guided by a relentless wonder, by a series of ever-expanding questions, displaying a naturally inductive mental process which the mind can be trained to perform accurately and rigorously.

In scrutinizing concrete economic processes, Jacobs spends a great deal of time trying to discover the conditions under which they function best. She seeks to understand the role that these conditions play in growth and development in order to know how to

foster and encourage innovation and creativity elsewhere.

However, she does not believe that there is a necessary cause and effect relationship between these conditions and innovative growth. Jacobs makes a distinction between creativity and efficiency, insisting that while efficiency can be forced and guaranteed, creativity cannot. The creative process is messy, inefficient, and unpredictable. We can foster the conditions of freedom and opportunity which creativity needs, but we cannot coerce or guarantee results.

Cichello's (1989) analysis was not only insightful and detailed, but also nuanced in how it identified a potential driver of Jacobs' genius, the spark of creativity. "[M]essy, inefficient and unpredictable" (Cichello 1989, p. 158) was very much how Jacobs seemed to find her work on a daily basis, but it had the unexpected and elusive quality of brilliance.

### Jacobs' Chronology: Pioneering Inductive Methods

Jacobs used inductive methods to distil her hypotheses from her voluminous observations before 1961; Glaser and Strauss published grounded theory in 1967; Yin published in 1984; the key text on induction by Holland et al. appeared in 1989. Bernard, Cresswell, Hirt and Alexandridis all published in 2000 or well afterward. To our knowledge, no one, it seems, used inductive methods or the inductive/deductive loop on real social science cases, real data and real cohorts the way, and to the extent, Jacobs did before the 1980s. If, for the sake of the argument, we were to calculate a median year from our references, it would be 1996, thirty-five years after Jacobs' most influential book was published. It would be an understatement to say that the widespread acceptance of inductivist methods for hypothesis generation in the social and life sciences took decades. Jacobs was not only an early adopter; she was a pioneer of a method that had not yet been theoretically developed and described when she was first using it to shape her insights into the dynamics of cities.

Judging by Jacobs' current critics, inductive methods are still commonly misunderstood. Simply put, Jacobs scooped the entire field, outpacing two or more generations of researchers. Academics, but also journalists and critics working outside the academia, still lack the background to integrate inductivist methods into their vision of the sciences. Without understanding that (seemingly random) participant observations of city street interactions con-

stitute acceptable grounded theory methodologies in the social sciences, those still predominantly trained in the mechanistic vision of a "pure" science will continue having methodological issues with Jacobs for working with non-reproducible anecdotes, personal observations, and asynchronous historical cases (Bratishenko, 2016; Harris, 2011; Manshel, 2010). Taylor (2006; 1984) observed that "[p]roponents of the hypothetico-deductive method are notorious for their disdain of induction and Jacobs bears the full brunt of their scientific narrow-mindedness." Now that we know that Jacobs' methods adhered to Popper's reconceptualization of the inductive / deductive synergy, those who still disdain Jacobs' work for methodological reasons show themselves to be, again, scientifically narrow-minded.

In "The Kind of a Problem a City Is," Jacobs (1961) wrote about the ability of science to advance from simple two-variable problems to those of both disorganized complexity and organized complexity. Jacobs opened the chapter with (1961, p. 428): "Thinking has its strategies and tactics too, much as other forms of action have. [...] Among many revolutionary changes of this century, perhaps those that go deepest are the changes in the mental methods we can use to probe the world." Jacobs could not have said it better if she were trying to describe the revolution of displacing the "objective" mechanistic analysis in favour of non-mechanistic approaches. And she was, of course: She realized that working inductively, "reasoning from particulars to the general, rather than the reverse" (Jacobs 1961, p. 440), avoided the pitfalls of being driven into absurdities of sterile generalizations. While she embraced inductive reasoning as the obvious way to make sense of the rich data of organized complexity, academia did not catch up to her insights until decades later, and even then, haltingly. Moreover, the academia and the fourth estate failed to see what, exactly, she was doing, and what she was *not* doing, inductively. Michael Polanyi (writing relevant pieces between 1958 and 1966) was the only major thinker to predate Jacobs' 1961 publication. Knowing this may, in turn, illuminate the hostility towards Jacobs' genius as a product of unfamiliarity rather than malice.

## CRITICAL ASSESSMENT OF JACOBS

### Pragmatism versus Ideology

Now that we have discussed Jacobs' research and writing methods, even more problematic in our opinion is the contention that Jacobs simply illustrated her prior beliefs through a haphazard selection process and did not enter-

tain consistent or ideological “positions” on issues. We have already shown that Jacobs did not work abductively to prove a priori hypotheses. Still, critics like Manshel (2010) accused Jacobs of arriving at conclusions that were sometimes “overblown and/or oblivious to the facts.” Cases in point were Lincoln Center that was “instrumental in revitalizing the surrounding neighbourhood” and how “hyper-gentrification... obliterated demographic diversity in the West Village” (idem) Again, while these specific accusations might have validity, some evidence nonetheless suggests that Jacobs did indeed change her mind over time on issues such as urban renewal policies, the Marshall Plan and the “political and economic unification of Western Europe,” eventually rejecting ideas she originally supported (Jacobs 1952 in Allen 1997, p. 174) before reaching different conclusions at a later date (Jacobs 1984).

Of course, the belief that one can let the facts speak for themselves is ancient and has long been criticized on the grounds that facts only speak through prior human (mis) conceptions (Mises 1957). Indeed, Jacobs readily admitted: “Everybody’s got a worldview whether they know they have it or they don’t... And they are making coherence of what’s good, what’s bad, what will work, what won’t work, what’s noble, what’s ignoble, and so on...all through this filter...” (Kunstler 2001). She nonetheless suggested it was possible to “stay flexible enough or curious enough and maybe unsure of yourself enough, or maybe you are more sure of yourself—I don’t know which it is—that the new things that come in keep reforming your world view” (idem). Yet, she arguably could not let the evidence speak on the generally accepted notion that restricting the supply of land and legislating its use through various measures (e.g., rent control, zoning, etc.) would result inevitably in increased scarcity and higher prices of housing.<sup>28</sup>

Another common critique of Jacobs’ method was that learning about the present in light of a by-gone era was pointless because of changed conditions and the emergence of new actors, most prominently large R&D laboratories. This belief was arguably dominant among regional development experts by the middle of the twentieth century. Technological changes and the enhancement of labour and entrepreneurial mobility, many of them argued, meant that “such local [Marshallian industrial] specialization... [had] become increasingly rare” while, by contrast, “external economies on the broader basis of urban size and diversity [had] remained a powerful locational force” (Hoover and Giarratani, 1984/1970, p. 121). Schrag (1969) thus (rather lyrically) dismissed Jacobs (1969) as often reading “like a

passion of worlds long gone, separated by continents and ages of time, a romance washed up from a distant shore, well reasoned, documented and persuasive, but mythic nonetheless. A fable of creation,” for what indeed could pin makers, saddlers, potters and wheelwrights teach the world of “ABM and NASA”? Friedmann (1970, p. 479) similarly argued that:

the world had come a long way since the days of [brasiere inventor] Mrs. Ida Rosenthal, and history may be of little aid to us in the future. If industrial research is centrally controlled, as it appears to be in many companies, the location of this activity may be of less importance than the structure of the industry, its business environment, the amount of resources it is devoting to research, and the direction of its laboratories. What may have been true until recently may no longer be true, except perhaps for perilously competitive economies such as Hong Kong’s, where a measure of the old artisan spirit still seems to prevail.

And yet on this, as on a number of other issues, it was Jacobs rather than her critics who was admittedly proven right in later years in light of the demise of many big R&D units and the rise of regional economies such as Route 128 (Boston), Silicon Valley (Bay Area) and Hong Kong/South China.

We posed the question of Jacobs’ ideological leanings, and her willingness to change her opinions and positions, to Lawrence Solomon. Solomon was a long-time colleague of Jacobs and the co-founder, with Jacobs, of Energy Probe, a non-governmental environmental policy organization, in the late 1970s. Solomon summed up Jacobs as: “principled, fearless, non-ideological”.<sup>29</sup> He added that Jacobs disliked welfare and public housing, was “allergic to expropriation,”<sup>30</sup> both physical and ideological, scoffed at population control ideas, and at attempts by any and all governments to over-regulate and control. Energy Probe’s statement of principles is still filled with values Jacobs would agree with as it aims to “work for environmental sustainability by promoting property rights (private or communal), markets, the rule of law, the right to know, accountability through liability, cost and risk internalization, economic efficiency, competition, consumer choice, and an informed public” (Energy Probe 2016, n. p.).

Solomon suggested that unlike the “academic” side of Jacobs usually on display, her real driver was the desire to act and to solve practical problems. Jacobs “always talked

policy, never politics.”<sup>31</sup> Those seeking to understand her may be surprised, Solomon said, by the extent to which she was motivated by advocacy: “When there was a fight, she changed her approach. She’d fight tooth and nail. You’d never guess that if you only knew her books.”<sup>32</sup> This pragmatic and passionate approach was consistently displayed when it came to aesthetics as well. A building’s primary function was to do or facilitate something: “[S]he did not care about the shape. She cared about the function.”<sup>33</sup> This functional, pragmatic, solution-driven approach may yet be the closest to a *modus operandi*, if not an ideology, for Jacobs.

Jacobs’ views and actions on municipal zoning in Toronto may be a particularly good example of her “policy over politics” and “function over form” approach. Jacobs maintained that the ideal city evolved into mixed-use zoning.<sup>34</sup> While she opposed restrictive zoning in principle, she appeared to prefer fighting specific battles that resulted in tangible positive results for the city, as opposed to getting mired in ideological debates. Jacobs, with then Toronto mayor Barbara Hall, led the fight to have mixed use established on King Street.<sup>35</sup> Once the two women won, King Street became a vibrant mixed use area, and a destination for diners, art aficionados, and seekers of artisanal products. As policy analyst Janet Neilson<sup>36</sup> noted, when it came to municipal zoning, Jacobs “would prefer to transform [it] rather than abolish.”<sup>37</sup> While Jacobs was definitely against “strict zoning that tries to segregate uses,” Neilson noted, “it’s hard to make the case that she was against zoning all together”<sup>38</sup> as she approved of heritage zoning. In the *Death and Life of Great American Cities*, Jacobs had, in fact, called heritage zoning a case of “zoning for diversity”:

Zoning for diversity must be thought of differently from the usual zoning for conformity, but like all zoning it is suppressive. One form of zoning for diversity is already familiar in certain city districts: controls against demolition of historically valuable buildings. Already different from their surroundings, these are zoned to stay different from them. (1961, p. 252)

Here Jacobs saw the selective use of zoning as a tool to preserve diversity while still cautioning against zoning as a panacea. Jacobs appears to have practiced case-by-case analysis using her inductive method to arrive at practical solutions balancing between regulatory guardianship and individual needs. With Jacobs, as the New York clergyman S. Parkes Cadman once said, it can be said that a “little ex-

perience upsets a lot of theory” (cited by Laurence 2009, p. 274).

### City as Organism

If Jacobs’ use of induction was ahead of its time, in our opinion her increasingly strident position that cities are quasi-organisms with lives of their own wasn’t (and was arguably mistaken). In this, though, Jacobs is for once among the mainstream of urban and regional development theorists. For instance, if Friedmann (1970, p. 480) faulted her for emphasizing “artisan creativity,” his alternative was to look at “the behavior of systems of cities and the structure of political controls by which such systems maintain their stability.” For his part Fox (1970, p. 465) suggested that a “better framework lies in central place theory.” In the last three decades regional development scholars who have put more emphasis on localized innovation have examined it through frameworks such as “innovative milieux,” “learning regions,” “regional innovation networks,” “industrial districts,” and “clusters” (Rutten and Boekema 2007). In these perspectives the units of analysis are aggregates that in reality do not engage in production and exchange, nor do they enter and exit markets.

In our opinion, while Jacobs was on the mark when she described cities as nexus of trade and business hatcheries that greatly facilitate injecting improvisations into daily life, her increasingly holistic stance over time lost track of the fact that cities do not arise out of thin air and are, in the end, sustained through both individual human actions based on local transactions and affected by local conditions (including government controls of all kinds) and other transactions and institutional arrangements that take place at a much larger geographical scale.

The way out of this conundrum for regional analysts, we suggest, is an ontological stance that is built on methodological individualism, a topic one of us explored in more detail elsewhere (Leppälä and Desrochers 2012). Suffice it to say here that in his review of *Cities and the Wealth of Nations* development economist Peter Bauer (1985a n.p.; see also Bauer 1985b) hit the nail on the head by observing that:

Mrs. Jacobs rightly argues that the practice of economists of concentrating on nation-states causes them misleadingly to group together rich regions and poor ones within the same nation. But much of her discussion is marred by similarly inappropriate abstraction in treating cities and markets as if they were single decision-making units of homogeneous entities whose

components had identical interests. Thus she may write of a city or a market as though it were an organism with a life of its own.

Friedmann (1970, p. 478) also arguably made a valid point when he discussed Jacobs' musing on the importance of inter-city trade and distant cities as opposed to the immediate hinterland of one urban agglomeration:

In the end, it does not seem to matter where the markets for new industries are located, but only that markets exist and that they stimulate new productive activity. Whether within the city, in the city's immediate hinterland, or in distant regions, it is market development rather than trade that is decisive to a city's growth.

While Jacobs might often have been right when most credentialed experts were wrong, there is little doubt in our opinion that her work would have benefited from the criticisms of knowledgeable and open-minded academics such as Peter Bauer before it was published in book form. To our knowledge, only *Systems of Survival* underwent something like peer-review when an academic conference was devoted to an early discussion of Jacobs' main ideas for the book (Lawrence 1989).

### Theorist or Popularizer?

Perhaps one of the strangest claims made against Jacobs by some commentators was that she was anti-theoretical. As Harris (2011, p. 69) observed, "[t]he conventional wisdom, fostered by Jacobs herself, is that she worked inductively and was averse to theory. This is a quarter truth. Far from being averse to theory, she devoted most of her life to developing it. All her major works are guided by clear questions and a theoretical purpose." This is indeed one of Jacobs' main inconsistencies, for, as Warsh (1992) observed, if she had little use for most experts, she was an expert herself. To rephrase somewhat Harris' comments, one could suggest that, like many theorists, Jacobs was allergic to other people's theories and thought her alternative superior. "What makes her truly distinctive" though, Harris added, was that, not unlike "those advocates of old-style urban renewal whom she so vigorously criticized, Jacobs 'rarely felt the need to define her own ideas explicitly and consistently in relation to those of other theorists.'<sup>39</sup> Rather than upgrade or extend an existing idea, or work within an established grid of assumptions, she preferred to bulldoze everything and start from

scratch" (Harris 2011, p. 70). And because she "apprenticed as a reporter" she was "ill equipped, as well as disinclined, to construct a fully documented narrative" (Harris 2011, p. 72).

These charges strike us as valid if somewhat unfair, if only because Jacobs typically attacked specific problems from a much greater variety of angles than people trained in, and belonging to, particular academic sub-cultures. As anyone who seriously attempts to cross disciplinary boundaries or who was assigned to a university-wide ethics review board can attest,<sup>40</sup> similar realities are often described and examined in very different ways by insular academic tribes who do not even share a common language, and in some cases seem to believe either that reality is optional or beyond their field of inquiry. Getting back to basic insights and patterns seems the only logical approach for a theoretically-minded independent writer who is writing for a broad audience and communicating her findings through a commercial publisher. Unlike subsidized academics given the rare privilege of writing without having to worry about being read, Jacobs was very mindful of the fact that her publisher not lose money with her books.<sup>41</sup> Perhaps another reason for Jacobs' reluctance to truly engage academics is that the minor sub-disciplines (urban and economic sociology; urban and economic geography; urban economics and regional science) and more established fields (urban planning, development economics and business ethics) that should have been her natural intellectual feeding grounds were, by and large, hostile to her bottom up and generally *laissez faire* conclusions.

Joseph Stiglitz (2007) said a few years ago of journalist Naomi Klein (2007) she "is not an academic and cannot be judged as one," a statement that in our opinion should be interpreted as not faulting her for not writing and doing research like an academic. For the sake of the reader, this should not shield a public intellectual from critical scrutiny as to the validity and consistency of her ideas, and in our opinion Klein is arguably too much of a demagogue, as opposed to an original theorist, to be compared to Jacobs. What should ultimately matter though is that Jacobs was both a theorist and a public intellectual whose analysis should be compared and contrasted to that of other thinkers and theorists based on her overall arguments and synthesis—as was for example the case in Glaeser et al. (1992)<sup>42</sup>—rather than by whether or not she was part of a conversation in a particular sub-discipline.

Another consideration is that Jacobs' ultimate goal was to identify perennial economic patterns. Seen in this light,

whether she identified those patterns by reading Herodotus, Alceus or early 20th century economic geographers rather than more recent academic researchers who often reframed older ideas with new jargon, expository methods and empirical evidence should not be viewed as an intellectual deal breaker, at least inasmuch as recent academic work in economic development typically fails to acknowledge predecessors or parallel research lines in adjacent academic sub-disciplines. What would really matter then is whether or not Jacobs' synthesis addressed all the issues relevant to her particular questions in a manner that was internally consistent while adding to previous formulations.

One way to make the previous considerations more tangible is to look at the long-standing view that local economic diversity is more desirable than dominance by a single industry. Traditional arguments to this effect broadly fall within three categories. The first is "urbanization economies," or the idea that diverse firms in close geographical proximity to one another benefit from a wide range of better and more affordable services than would otherwise be the case (e.g., software programmers whose skills can be adapted in a wide range of industries). Second, a diversified economic structure is deemed more desirable for local job creation when a new productive activity is added to the local mix because of the presence of a large number of potential local suppliers the new firm can buy from. Finally, diversified local economies are inherently more stable and resilient than highly specialized ones when one line of work (e.g., Kodak film production) becomes obsolete, or when distant competitors<sup>43</sup> overtake local firms.

Jacobs' writings, however, went beyond these arguments and explained in more detail the importance of local economic diversity for entrepreneurial and innovative activities, including the importance of new combinations for innovative work and how crucial local economic diversity is for this process. It is true that a few decades before her Keir (1919) had lamented the deleterious effect of the "blight of [local] uniformity" on human creativity. Closer in time to Jacobs, the economist Simon Kuznets (1960, pp. 328-29) had discussed the "interdependence of knowledge of the various parts of the universe in which we human beings operate" where, for instance, "discoveries and inventions in the field of tensile strength of metals contribute to discoveries and inventions in the field of electric currents." He suggested that "creative effort flourishes in a dense intellectual atmosphere, and it is hardly an accident that the locus of intellectual progress (including that of the arts) has been preponderantly in the larger cities, not in the bucolic sur-

roundings of the thinly settled countryside." This was attributable to the "existence of adequately numerous groups in all fields of creative work" and the "possibility of more intensive intellectual contact, as well as of specialization, afforded by greater numbers." While Jacobs did not mention either Keir or Kuznets, we contend that her discussion of these ideas was arguably more detailed and therefore original. The criterion by which Jacobs should be judged is therefore not whether she was the first to state an argument, but rather whether or not she fleshed it out better than previous writers.

It is also through such criteria that one should examine the charge that, especially in *The Economy of Cities*, she was merely popularizing earlier concepts such as agglomeration economies, export-based multiplier, and opportunity and transaction costs already discussed at some length by scholars such as Thompson (1965), Tiebout (1962), Lichtenberg (1960), Pred (1966), Myrdal (1957) and Pirenne (1949/1927) (Keeley 1989c; Algaze 2001). Here we suggest that these authors themselves often did not cite a range of predecessors who had expressed similar ideas (see, for instance, the literature review of Krzyzanowski 1927) and that, as discussed in more detail by Keeley (1989c), Jacobs' formulation of somewhat similar insights was more complex than that of either Tiebout (1962) or Thompson (1965).<sup>44</sup>

This being said, Jacobs did acknowledge a few scholars to whom she was particularly indebted. A case in point is historian Asa Briggs' (1963) treatment of the distinct economic characteristics of Victorian Manchester and Birmingham, arguably Jacobs' (1969) key comparison in her case for the benefits of economic diversity that departed from the teaching of conventional urban economics. Briggs' key passages are worth quoting:

...the two cities were very different from each other during all periods of the nineteenth century. Four conditions of work in Birmingham set the terms of its social history. First, there was great diversity of occupation... Second, work was carried on in small workshops rather than in large factories, and economic development through the century multiplied the number of producing units rather than added to the scale of existing enterprises. Manchester was quite different in this respect... Third, a large proportion of the Birmingham labour force was skilled and therefore relatively well-off economically... Fourth, there was considerable social mobility in Birmingham, or at

least considerable local optimism about the prospects of “rising in society” (Briggs 1963, pp. 188-189).

Another consideration to keep in mind when discussing Jacobs’ work is the then dominant perspective on the issues she addressed. Suffice it to say that if in 1955 the urban historian Eric E. Lampard (1955, pp. 83–84) could observe in a literature survey that “no systematic study has ever been made of the role of cities in recent economic development,” by the time Jacobs entered the scene the dominant framework of analysis was largely centered on “statements of the spatial conditions required for economic success, but they are not explanations of the process of economic development and spatial evolution” (Watkins 1980, p. 129) and virtually ignored entrepreneurship and small innovative firms (Baumol 1968). Indeed, as Miyao (1987) could write after the publication of *Cities and the Wealth of Nations*: “Despite the long-standing recognition of the role of urban growth and dynamics among economists, most urban models in the economic literature have been completely static in nature, and very little has been done to formulate dynamic urban models.”

Speaking directly to Jacobs’ economic contribution, the Austrian School economist Sanford Ikeda (2006a) expressed similar ideas when he wrote that “[l]ong ago, mainstream economics stopped thinking about markets as urban, and replaced it with what Jacobs called the ‘plantation model,’ in which diversity of inputs and outputs and the uncertainties of time were replaced with simple production functions in a world where time doesn’t matter and preferences don’t change.” In this perspective the emphasis “switched from diversity and complexity to homogeneity and simplicity, from dynamics to statics, and from creativity to efficiency” as mainstream economics became “fixated on this notion of ‘efficiency,’ where today is basically the same as yesterday and tomorrow the same as today, and nothing can be made to work better than it already is.” For Jacobs though, the “successful city is inherently inefficient, and that’s a good thing because a successful city is an incubator of new ideas, where ordinary people, not just ‘creative types,’ can be innovative. Innovation, trial and error, can be messy and inefficient.”<sup>45</sup> A few years later, Ikeda (2012, p. 80) added that

[t]o the extent that current thinking about economic progress, whether in developing or mature economies, does not take adequate account of the centrality of cities, entrepreneurial discovery, the non-market foundations of economic development such as trust and

social networks, and the importance of demand- and supply-side diversity, Jacobs offers a valuable alternative perspective. Hers is a narrative of a dynamic process in which, in the context of economic freedom, diversity and density give rise to discovery and development.

Arguably, Jacobs’ synthesis and extension of insights that might have once been better appreciated, but had essentially been forgotten by prominent researchers at the time of her writing, was valuable. Besides, Jacobs was certainly original (if not right) in her theory of agricultural origins as a by-product of early urbanization (Bender 1975). The pioneering economic complexity theorist Peter Albin further observed upon the launch of *Cities and the Wealth of Nations* that Jacobs “takes account of what I would call the complexity variable” and “sees cities as multilayered units with much redundancy, and with adaptive capacity” (quoted by Warsh 1992, p. 398). He suggested that she be “looked at more seriously by economists, as the source of a structural theory of technical change, where the word “urban” is less important than underlying terms like complexity, redundancy, thresholds and the rest” for there was in his opinion no similar theory “anywhere in the [economic] literature” (idem).

It is possible, though, that Jacobs did not acknowledge the influence of writers whose reputation was somehow tainted, such as her likely professor George Renner whose work we profiled in the first part of this essay. Algaze (2008, p. 30) further believed she must have come across Herbert Spencer’s (1898) writings for he long ago believed that a “tendency toward increasing heterogeneity was inherent in all features of the universe.”

To be fair, however, even a number of prominent writers sympathetic to her perspective had misgiving about her contributions based on her lack of knowledge or misunderstanding of basic economic theory. The political economist Mancur Olson thus criticized *Cities and the Wealth of Nations* in the following terms:

[Jacobs] has got a strange sort of inductive discovery of the market in [*Cities and the Wealth of Nations*], and even, I think, in *The Economy of Cities*, which has come with the most complete innocence of economics as a discipline. In a way she argues for the market without knowing it. Now she mixes it up with all sorts of ideas about cities which are not really to the point and some ideas about import-replacement which are simply confused and with a general slander against

economic theory because in fact she doesn't understand it. But I think she has some extremely valuable insights, and I think we should value them all the more because she came by them on the strength of her own observation. (quoted by Warsh 1992, p. 397)

Perhaps the most lethal critique of Jacobs' economic work was penned by the free-market development economist Peter Bauer (1985a) who highlighted, among other issues, how her description of economic theory seemed limited to development economics and Keynesian macroeconomics; insufficient appreciation of price theory and of the benefits of agricultural specialization (cash crops); distorted time perspective; and lack of appreciation and insufficiently critical assessment of how economic protectionism and political controls often hurt rural populations for the benefit of their urban counterparts.<sup>46</sup>

However, even Bauer found lasting value in Jacobs' work. He thus observed that, in spite of her shortcomings, Jacobs' understanding of economic development and economic change was "well above most of the familiar contemporary academic and political literature" (Bauer 1985a) on the topic. Suffice it to say that had development luminaries such as Jeffrey Sachs read—and had the modesty to learn from—her, fatally flawed scheme like the "Millennium Villages" project would have never even been conceived as something worth investing in.<sup>47</sup> Optimistic population and resource economist Julian Simon also became somewhat enamored with her perspective, but unfortunately his untimely death deprived Jacobs of a potential champion.<sup>48</sup> Austrian economists Callahan and Ikeda (2003) further observed that, despite some gaps in her knowledge of economic thought and theory, Jacobs' writings illuminate how a "well-functioning urban area" and developing economies emerge "as the result of human action but not human design.... from a myriad of individuals each pursuing their own interest and carrying out their own plans, within a framework of rules that encourages peaceful cooperation over violent aggression." Finally, in an ongoing effort through several popular books, Steven Johnson (2001; 2010; 2014 among the most notable) has brought Jacobs' thought back to both the academia and to a new generation of readers, starting with a passionate narrative of her spontaneous order metaphors in *Emergence* (2001).

For all their flaws, Jacobs' economic writings often better stood the test of time than those of her highly credentialed contemporaries. This can likely be traced back in no small extent to her broad worldview and inductively-based

hypothesis creation methodology that always attempted to ground her understanding in real-world conditions and processes without preconceptions and disciplinary hierarchies.

## REFLECTIVE CONCLUSION

The ideas of Jane Jacobs have elicited a range of reactions in a multitude of readers, scholars and writers, both in the academia and in wider intellectual circles. Some of these reactions have led to celebrations of her work and life, for example the widely popularized *Jane's Walks* (Storring 2014). Jacobs the urban activist, pragmatic and focused on specific change, became Jacobs the conservationist, the icon of environmentalism, the conveniently pessimistic author of *Dark Age Ahead* (Jacobs 2004a). The novelistic deification of Jacobs as Saint Jane, alongside Saint Bridget Stutchbury, Saint Rachel Carson, and Saint James Lovelock, all gracing the liturgical calendar of a group of agriculturalist disaster survivors in Margaret Atwood's dystopian novel *The Year of the Flood* (2009, pp. 161, 349), shows where the image of Jacobs has traveled in popular culture, and, perhaps, how far the tide of enduring interest has deposited her from where the urban planners and economic geographers would have expected to find her.

Critical voices among public intellectuals still remind readers that deification distorts. Some critics do so in order to swing the pendulum in the other direction, but few of them can avoid the fact that Jacobs' work remains read and relevant. Bratishenko (2016 n. p.), in an effort to "re-balance" Jacobs' life in light of her less known works compiled by Zipp and Storring (2016), condemned Jacobs for "tunnel vision," NIMBY-ism and for her life-long adherence to free-market principles. Bratishenko (2016) wrote, bitterly, that Jacobs failed—as a theorist, as an activist, as an icon—in not being able to save neighbourhoods, including her own, from gentrification. She failed because she lacked the necessary ideological accoutrements of a modern urban saint: the Marxist desire to redistribute and equalize. "Jane Jacobs, crypto-libertarian, offers nothing that would upset the capitalists, and we should not be surprised that she continues to be relevant" wrote Bratishenko (2016 n. p.) in an effort to paint her as a friend of rapacious developers and big business.

In a concise statement on Jacobs' main shortcomings as a social analyst, Harris (2011, pp. 80-81) commented that "[b]y the normal standards of scholarship, in the humanities as well as in the social sciences, her books are defi-

cient in key respects. They assert but fail to demonstrate; they rely on anecdotes; they rarely engage with the ideas of other writers who have tackled the subject.” One could also reasonably assume that in an age dominated by the stylistic conventions of critical theory and postmodernism her readability is also held against her by a number of urban theorists.

One can think of a few defenses of Jacobs in this latter respect. As Creed Rowan (2011, p. 44) observed, and as we showed in our first article, Jacobs obviously “picked up her literary craft not from the other urban planners with whom she is so often compared but from city journalists, hard-boiled novelists, settlement-house writers, and others who wrote for the general public.” And although she appreciated the work of some professors, her lifelong resentment against much of academia and her much broader range of interests than those entertained by more conventional thinkers meant she never felt compelled to abide by (and probably got some personal satisfaction in flaunting) traditional research norms in terms of both methods and exposition.

Perhaps Bendixson (1970, p. 654) put it best when he observed that

Jane Jacobs has rare qualities as an observer and commentator on city life. She manages to combine the viewpoint of a corner tobacconist or sweetshop owner with a knowledge of what writers such as Herodotus have had to say on the matter. Hardly any other living urbanist shares this breadth of outlook, and yet it is obvious that cities—the most complex of all our institutions—cannot be explained by anything less comprehensive. As it is, the fate of city-dwellers everywhere tends to hang to a frightening degree on the understanding and policies of traffic engineers, students of labour markets, architects and other experts.

While Jacobs’ decentralist outlook has had little if any impact among prominent economic geographers, it was appreciated by a number of free-market economists whose work put them somewhat apart from the dominant neo-classical paradigm.

In order to make sense of the economic world around her, Jane Jacobs relied on direct observation and common sense. Paradoxically, this common sense made her something of a radical thinker and a pioneer of modern inductive research methods.

As we have shown, Jacobs introduced and refined methodological innovations of inductive hypothesis forming and

deductive testing that should be acknowledged by scholars as trail-blazing. Whereas the grounded theory / deductive testing feedback loop is now used widely in science and social science research, Jacobs’ deliberate and committed use of this method pre-dated the key late 20th century insights into the relationship between induction, deduction and the scientific method, landing her in hot water with the establishment for her methodological amateurism. Her overall outlook should be a model, inasmuch as profoundly original thinking can be a model, of how to express a deeply individual and engaged knowledge in objective and universally accessible ways.

## NOTES

- 1 Warren Weaver left the mathematics department of the University of Wisconsin in 1932 to join the Rockefeller Foundation (Rees 1987 is a detailed biography). Laurence (2006, p. 165) observed that Jacobs came upon this essay serendipitously as it was reprinted in the Rockefeller Foundation’s 1958 Annual Report that first listed her grant to study “the relation of function to design in large cities.”
- 2 To a critical realist, objects, entities and events exist independently of their observers’ perception of them. Lewis (1996) describes the world with those properties as structured and intransitive.
- 3 Stewart Brand is the creator of the *Whole Earth Catalog*, described as a “counterculture magazine and product catalog” at [https://en.wikipedia.org/wiki/Whole\\_Earth\\_Catalog](https://en.wikipedia.org/wiki/Whole_Earth_Catalog). Likely because of an overlap of interests and methodologies, Jacobs and Brand had crossed paths on a number of occasions, Jacobs writing reviews for Brand’s books, and Brand interviewing her in 1998, among other documented interactions.
- 4 Honey badgers (*Mellivora capensis*), found across much of central and southern Africa and in southwestern Asia, are small carnivorous mammals taxonomically in the Weasel family (Shapiro n.d.) yet resembling Wolverines or skunks. Highly intelligent and fearless, honey badgers appear to be able to strategize and work collaboratively with select other species of animals while hunting.
- 5 On the commonalities between Jacobs and Lonergan, see Lawrence (1989) and Byrne (2003).

- 6 Interview of Jim Jacobs and Margie Zeidler by Desrochers, Ikeda, and Szurmak, March 12, 2016, p. 1 of 9.
- 7 idem
- 8 Conversation with Lawrence Solomon conducted by Desrochers and Szurmak at the Toronto Green Beanery *Grounds for Thought* event “The Real Jane Jacobs” on July 26, 2016.
- 9 While Jim and Larry Solomon only mentioned Adam Smith, we discuss Asa Briggs (1963), one of the few influences Jacobs acknowledged, in another section of this article.
- 10 See, among others, her discussion of Boston’s North End neighbourhood as seen through the eyes of an urban planner.
- 11 As Jacobs told Kunstler (2001) about the only sociology course she took at Columbia: “I sat in on one in Sociology for a while and I thought it was so dumb.” One suspects, however, that this wasn’t a Chicago School-inspired urban sociology class...
- 12 Personal communication with Desrochers, 2003. Apparently Jacobs was still on good terms with the *Time Inc.* conglomerate.
- 13 Typed notes of the interview of Jim Jacobs and Margie Zeidler by Desrochers, Ikeda, and Szurmak, March 12, 2016, p. 1 of 9. Notes were read and verified by Jim Jacobs on March 26, 2016.
- 14 As per note 13.
- 15 As per note 13. “Jane wrote *Dark Age Ahead* while recovering from a stroke. The recovery was apparently quite fast, but Jim said that for a period of about eight weeks Jane could not communicate by speaking. She seemed to have the episodic sections of the book pop out of her mind, but she just typed them out without the whole process of mental layout, revising and reading the work “at” herself, and then meticulously questioning and rewriting it until there were no contradictions. This vast difference in her writing process explains the different texture and content of the book.” p. 2 of 9.
- 16 Interview of Jim Jacobs and Margie Zeidler by Desrochers, Ikeda, and Szurmak, March 12, 2016, p. 1 of 9. Notes were read and verified by Jim Jacobs on March 26, 2016.
- 17 As per note 16.
- 18 As per note 16.
- 19 As per note 16.
- 20 As per note 16.
- 21 Conversation between Lawrence Solomon, Desrochers and Szurmak, July 26, 2016.
- 22 As per note 21.
- 23 As per note 16. Jim Jacobs: “When she got up in the morning, you could see the look on her face, in her eyes, that she was “seeing” in her mind what she would be writing later in the day. Her ideas would be composed and ordered in her mind and she looked as if she were reviewing them, on a page, in front of her eyes. She was thinking about her ideas before she started writing. She could hold entire pages in her head.” p. 1 of 9.
- 24 As per note 21. Solomon said: “She typed her manuscripts, revised with pen, up to 6 drafts. She would think a lot before starting. Typewriters require you to think. Jane wrote out the whole chapter. Sentences were fully formed.”
- 25 As per note 16.
- 26 As per note 16. Jim Jacobs: “She was her own arbiter and audience, and she was highly critical. If she was not happy with the text, it went to the bin. The bin got taken out one day a week, on Tuesday. The rejected typescript pages would be in the house for a few days until garbage day arrived when the bin would be put outside. Once Jane threw out some pages, she would re-write the piece from inside her head again. Sometimes she went back to the bin and brought some pages back. Some ideas made sense again once she re-thought them.”
- 27 As per note 21.
- 28 Interview of Jacobs by Desrochers, Hospers, Ikeda and Shimizu, 2004.
- 29 As per note 21.
- 30 As per note 21.
- 31 As per note 21.
- 32 As per note 21.
- 33 As per note 21.
- 34 As per note 21.
- 35 As per note 21.
- 36 Neilson now goes under the name of Janet Bufton.
- 37 Social media conversation between Bufton, Ikeda and Szurmak, August 2-5, 2016.
- 38 As per note 37.
- 39 We will not address the common charge that in her earlier books Jacobs (1961; 1969) was still writing like a magazine columnist and did not provide her readers with a suitable bibliography (Abrams 1969; Friedmann 1970; Hodge 1970; Starr 1969) because she addressed

the problem in her later work. Besides, the lack of acknowledgement of recent work in the field of local and regional development was arguably even worse in the case of Paul Krugman (see the very diplomatic critique of Fujita and Thisse 2009).

- 40 This was Desrochers' lot for a few years...
- 41 Conversation between Jacobs' son Jim and Desrochers, 2008, and between both authors and Jim Jacobs on March 12, 2016.
- 42 For a critique of the framework used in this paper see, among others Desrochers (2001) and Desrochers and Leppälä (2011).
- 43 For some historical perspective on these issues, see Desrochers and Sautet (2008).
- 44 In short, Keeley (1989c), building on a personal communication with French-Canadian economist Marcel Côté, suggests that Jacobs differed from her predecessors by detailing the emergence of new growth in particular situations and by emphasizing the multiplying effect of import replacement.
- 45 During our interview on March 12, 2016, Jim Jacobs offered a view on Jacobs' "city as an incubator" in which everyone has a chance to innovate. Jane's theory of cities as sporadic incubators of innovation centered on what Jim called a large, unemployed, and affluent labour force concentrated in an area also replete with other underused resources. Such a scenario would naturally arise in a city during a serious economic downturn when entire industries would be speedily put out of business by a new development, or else by outside competition, be it by similar businesses or a new substitute for an old way of doing things, as happened in post-war Los Angeles. These industries would still have capital, a motivated and skilled labour force, real estate and machinery. What was needed was the impetus to do something else, something new in response to the crisis. Jim likened the scenario to that of bare agricultural soil with lots of fertilizer, or to an expanse of land after a forest fire. Jane saw industries retooling around new ideas and new production, spawning rapid growth over the five or so years until market saturation. At saturation, new entrants could not come in nimbly and add, while tweaking their product, to the industry output. A new entrant would be like a sapling trying to come through the undergrowth in a maturing forest: Able to germinate but not able to get enough sunlight and water (market share and advertising presence) to flourish beyond the initial stage.

- 46 For other critics of Jacobs from a classical liberal perspective on issues such as her insufficient appreciation of the role of prices or misunderstanding of the nature of stagflation, see Callahan and Ikeda (2003), Ikeda (2012) and Walker (1984).
- 47 As of this writing, Munk (2013) was the most readable criticism of the project.
- 48 In an essay published posthumously, Julian Simon (Kuran 2000, p. 105) observed that "Jane Jacobs (1969, chap. 1) argued with impressive anecdotes that even ideas that were mainly practiced in the countryside and have long been thought to have been developed there ... were really invented in cities and then diffused to the countryside. Density is an index of both the supply of new technology, through the number of trained minds to produce new ideas, and demand, including (1) the number of producers who will use the new techniques... and (2) consumers who will buy the products that are supplied with the new techniques."

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