

Jane Jacobs as a Development Thinker

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Abstract

Jane Jacobs is best known as a writer about cities and as a vigorous critic of urban planning. The purpose of this paper is to suggest that she should be read as a writer on economic development who focuses on cities as the principal sites of development. The recently upsurge of interest in migration policies and development is taken as the entry point into her work, e.g., to explain why "poverty reduction" through remittances will tend to be nondevelopmental. Her ecologically-inspired "tangled bank" conception of development as growth through differentiation is used to elucidate a number of developmental issues. It also shows how the "spin-off conundrum" of multiproduct diversification is important to industrial development policies. Several examples are outlined of how that problem has been approached.

Keywords: Jane Jacobs, development, migration, spin-offs

JEL: O1 (Economic Development); R1 (General Regional Economics); D2 (Production and Organizations).

Introduction

Jane Jacobs is best known from her first book *The Death and Life of Great American Cities* [1961] as a critic of city planning. Since then, she has written four books [1969; 1984; 1992; 2000] on economies¹ and on development—but with little note taken by the "professionals" in the field. I will argue that she should be seen as a writer on the development of economies with cities as the main sites of development.

There has been some note taken within the field of urban economics. Glaeser and colleagues [1992] construct and test three models of knowledge spillovers in cities. Roughly, the Marshall-Arrow-Romer (MAR) model emphasizes the grouping of firms in the same industry and predicts that local monopoly would out-perform local competition due to better internalization of the rewards to innovation. A model associated with Michael Porter also focused on groupings or clusters of like firms but emphasized local competition.

Jacobs (1969), unlike MAR and Porter, believes that most important knowledge transfers come from outside the core industry. As a result, variety and diversity of geographically proximate industries rather than geographical specialization promote innovation and growth. [Glaeser et al. 1992, 1128]

Glaeser and colleagues test the models and show that the "evidence is ... negative on MAR, mixed on Porter, and consistent with Jacobs." [Glaeser et al. 1992, 1129] The importance of interindustry spillovers will be considered below in the context of multiproduct diversification. However, the point to be made here is that the importance of Jacobs' work is by no means limited to "urban economics." She writes about development *per se* and argues that cities and their regions rather than nation states are the main sites of development.

In Robert E. Lucas' work on endogenous growth theory, he noted "I will be following very closely the lead of Jane Jacobs, whose remarkable book *The Economy of Cities* seem to me mainly and convincingly concerned (although she does not use this terminology) with the external effects of human capital." [Lucas 1988, 37] However, the abstractions of endogenous growth theory soon lose the insights and policy implications of Jacobs' work.

Recently, migration has become a major issue in the United States and Europe on the receiving side, and it has equally become an important and controversial topic for the sending countries in the developing world. Globalization has accelerated both skilled and unskilled migration, and remittances back to many sending countries now bulk large as sources of foreign currency often exceeding official development assistance.²

Multilateral and bilateral development agencies are gearing up to develop new programs for this new world of migration [see Ellerman 2003]. However some surprisingly basic debates about the "nature of development" have emerged. One discourse sees the purpose of development assistance as poverty alleviation and increasing the living standards of poor people. Certainly

¹ She is careful to write about economies, not about "economics." In a recent book-length celebration of her thought and work [Allen 1997], the appropriate chapter is entitled "Economies."

² See Massey et al. 1998 and Rapoport and Docquier 2002.

remittances have that effect for the migrants and their families back in the home country. This line of thought goes further to question why should "development" be associated with jobs being near to where the family lives. We would not say a suburban "bedroom community" was "underdeveloped" just because the jobs were not there but in a nearby city. Why should a rural region in Mexico be considered underdeveloped just because the jobs are further away in the United States and the trips home are less frequent?

Long before the current debate, Jane Jacobs developed the arguments that this sort of migration pattern was fundamentally anti-development. And she did this by presenting a broader theory of economic development which made the analysis of migration obvious. I will use the migration debate as a useful entry point to approach her broader ideas about development.

Jacobs on Regions that Workers Abandon

Jacobs [1984] considers the problems of rural settlements or regions that workers abandon to migrate to jobs in cities. After World War II, workers from Turkey, Yugoslavia, and a number of other countries in southern Europe and North Africa were welcomed into northern Europe and particularly in West Germany. The remittances sent back were sizable, in some countries the single largest source of foreign exchange. Yet when unemployment rose abruptly in northern Europe (e.g., 1974 and 1980), hundreds of thousands of guest workers lost their jobs and returned to "the same unemployment and underemployment they had left." [Jacobs 1984, 74] The remittances, in the mean time, had not put their home regions on the road to development.

Remittances, while they last, do alleviate poverty in abandoned regions, just as any forms of transfer payments from rich to poor regions alleviate poverty while they last. The money buys imports for people and institutions which they would otherwise have to go without, but that is all it does. [Jacobs 1984, 75]

Jacobs tells the story of a small Mexican village, Napizaro, that for forty years has been dependent on remittances largely from migrant workers in the Los Angeles area.

Today Napizaro is as prosperous a settlement as can be found in its entire region. The village's twelve hundred people live, for the most part, in comfortable brick houses with pretty patios and TV antennas. The community has street lights, a modern infirmary, a community center, and a new bull ring named The North Hollywood in honor of the industrial section of Los Angeles, some fifteen hundred miles away, from which this prosperity comes. [Jacobs 1984, 75]

The road between Napizaro and North Hollywood is now well-trodden; it has become a way of life. When boys get to working age, they are trained by retired returnees about what to expect in the American factories, and other villagers working in Los Angeles help to find them jobs. Over the years, it seems that many of men have considered starting their own company at home since they had acquired most of the skills necessary. But they have abandoned the idea as it seemed that their village was too isolated.

The skills and experience the men have acquired in Los Angeles are usable only in the context of a city economy with its symbiotic nests of suppliers and its markets, not in this economically barren region. One and the same lack—a

vigorous city right in the region—forces the men to find work far away and also makes it impossible for them to start an industrial plant of their own, at home. [Jacobs 1984, 76]

While these observations are almost two decades old, little seems to have changed. At a recent World Bank conference, Manolo Abella, the head of the ILO's Migration Program, voiced some of the same skepticism.

There is general agreement among observers that by itself labour migration is unlikely to significantly improve the development potential of a sending country. While individual migrants and their families tend to gain from migration (in terms of greater economic security), the same cannot be claimed for the countries, as a whole. There is little evidence to indicate that labour migration and flows of remittances have generated sustained growth....

Take a look at the variation in recent development performance of major labour-sending countries—Mexico, Turkey, the Philippines, Pakistan, Yemen, Egypt, Morocco, Lesotho, Burkina Faso, Jamaica, etc. Which countries have managed to sustain high rates of economic growth? [Abella 2002]

Given the difficulties over the last half century with the remittances-may-lead-to-development strategy, there now seems to be some pressure to cut the Gordian knot by declaring that an improvement in living standards by remittances *is* development.

Development as Growth Through Diversification

There are a number of intermediate positions between the "remittances are development" view and Jacobs' ideas about development. What about growth based on the extraction of natural resources? What about casinos in Indian reservations, military bases (and little else) in a congressional district, or a company town in an otherwise rather barren region? While all these would provide local jobs (as opposed to distant jobs) and some growth, Jacobs would argue that none of them are developmental. Indeed, they may be a hindrance to development.

According to Jacobs, development is not just "growth" in the sense increased GDP income from remittances or natural resources or even more inputs leading to more outputs. Development involves change through differentiation, diversification, and transformation in the products and in the underlying processes of production—all of which might be hidden in the black box of increased "total factor productivity." For her, the "differentiating characteristic" of development is essentially the *differentiation* of products and services.

Epigenesis versus Preformation as Useful Biological Metaphors

The notions of "growth" and "development" are sometimes used almost interchangeably, but it would be useful to our purposes to make a sharp distinction. Jane Jacobs points out that there was a sharp distinction even in biology. In the history of embryology, there were two schools about the process of change from an embryo to a mature organism. The "preformation" school (e.g., Aristotle) saw the embryo as just a tiny version of the mature organism so the process of

change was one of quantitative growth. The epigenesis school saw the process of change as a qualitative process of differentiation and transformation.

Aggregate growth theory in economics does a disservice to the understanding of *development* by abstracting away from the difference between growth and development. A similar "theory" of biological growth of an embryo which saw an increase in food leading to the increase in, say, body weight—plus unspecified changes in "total food productivity"—would not even distinguish between preformation (growth) and epigenesis (development).



Figure 1: Growth Without Diversification

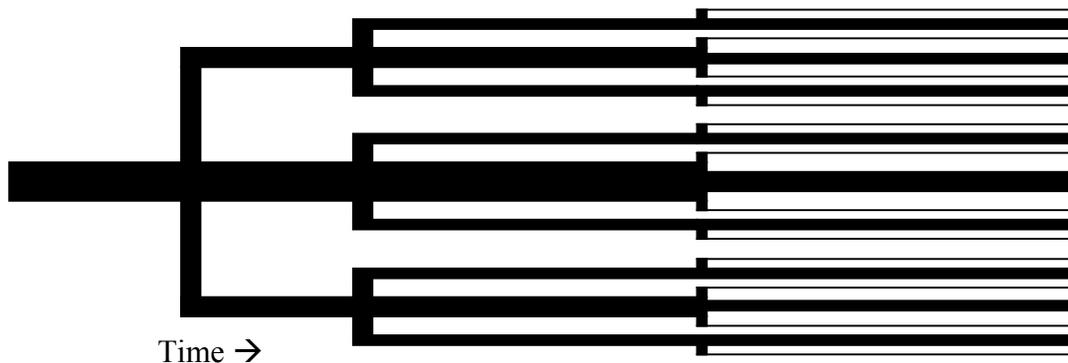


Figure 2: Development

The biologist, C. H. Waddington, described the "epigenetic landscape" of development through diversification as being more like a river delta than just a wider and deeper river.

One visual illustration would be the very final edge between the land and the sea in a great river delta like those of the Mississippi and the Nile—there are almost innumerable little separate rivulets of the fresh water running down to the sea, separated quite definitely but only by low banks of mud. [Waddington 1977, 116]

Thus development involves not just "growth" but diversification and ramification of different products and different kinds of work which might take place, in part, within firms but also through spin-offs, break-aways, split-ups, and the like. This tree-like "river delta" metaphor does not picture all the web-like connections between the diversified parts (see below on the "tangled bank" picture) but it does carry us beyond the picture of "growth" in aggregate output.

On a preformation theory of city growth, a "city" would just be a quantitatively bigger version of a small town, like a number of towns located together in a geographical area. But that is not what vibrant cities are nor how they grow. According to Jacobs, it is more like the process of epigenetic transformation, not blowing up a small balloon—with more K and L—to make a big balloon.

Jacobs' "Tangled Bank" Theory of Development

A rain forest and a desert at the same latitude would have about the same amount of solar energy arriving per unit area. In the case of the desert, it is essentially a sterile conduit; the energy comes in during the day and is dissipated at night. Little is captured; it is a through-put operation. The opposite is the case for the rain forest. Much energy is captured through the photosynthesis of its plants. Then the stored energy is passed around in a complex diversified web of relationships until it is finally dissipated through leakages. Plants die and decay to feed other plants. Plants are eaten by animals who are eaten by other animals, who give off waste products, or who die and decay to feed other organisms.

Jacobs constructs an ecological analogy by taking the imports coming into an economic settlement as being analogous to the incoming energy. Lacking the free energy of the sun, there must be some exports of commodities or services to fund the imports. The exports could be natural resource-based as with oil, gas, or minerals or they could be derived from agriculture. The exports could be manufactured goods which might range all the way from just the assembly of imported parts or kits to goods that result from an extensive chain of domestic value-added operations. Or the exports could be some form of services as in: a community supported by migrant workers, a community supported by tourism, a military base (seen as providing a public service), a retirement community living off pension income (past services), or a Bangalore-type operation (selling software services) which might be part of a more complex operation of products and by-products.

Vibrant cities and the regions surrounding them are more like diversified rain forests while some other economic settlements are more like deserts. A settlement is more like a 'desert' when the imports are dissipated in consumption or are incorporated directly into the production of what is exported. The settlement is a rather straightforward economic conduit.

A settlement is more like a 'rain forest' when the imports feed into a diversified web of local value chains—some goods being inputs into many other products or spawning import-replacements. The imports spread out like a river delta to directly and indirectly feed a diverse weblike 'ecology' of economic activities. Jacobs' vision of a developed economy recalls the famous "tangled bank"³ (i.e., "bank" of a stream) passage in the closing paragraph of Darwin's *Origin of Species* (6th edition).

It is interesting to contemplate a tangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately

³ The first edition had "entangled bank" in the closing paragraph and both the first and last (6th) editions used "entangled bank" with the same meaning in Chapter III. But "tangled bank" is the phrase that has come to express this vision, e.g., Baird 1946 and Hyman 1966.

constructed forms, so different from each other, and dependent upon each other in so complex a manner, have all been produced by laws acting around us. [Darwin 1999]

With the tangled bank image, Darwin surpasses the older imagery to arrive at a modern ecological vision of life that Jacobs has re-imported into the study of economies.

The image of the great Chain of Life is ordered, hierarchic, and static, essentially medieval; the great Tree of Life is ordered, hierarchic, but dynamic and competitive, a Renaissance vision; but the great Tangled Bank of Life is disordered, democratic, and subtly interdependent as well as competitive, essentially a modern vision. [Hyman 1966, 33]

The most sterile or inert desert-like settlements are the settlements based essentially on direct consumption of imports such as communities living off migrant worker remittances, retirement communities living off pensions (and income from capital invested elsewhere), and military bases. Not far behind are the settlements based on one stage of production with little local value-added and negligible local consumption such as agricultural or natural resource-based towns, tourist centers, casinos on Indian reservations in the United States, company towns, and labor-intensive assembly or processing enclaves. These are more like economic deserts (perhaps with one type of cactus) than economic rain forests.

Thus we get a clear contrast in definitions of development. By a living standards definition of development (e.g., GDP), an economic settlement made rich by pumping out oil would be "developed." But by Jacobs' definition, it is just a big pipe—an economic conduit—not a "tangled bank." And similarly for "exporting labor."

To become more ramified and complex, an economic settlement should have multiple uses for imports to produce diversified and multi-staged products with a significant part for local use. Each specialization to achieve efficiency should lead to diversification of outputs into various product niches, to backward integration to produce previously imported inputs, and perhaps to unexpected 'matings' with nearby processes and products to produce novel offspring.⁴ These are the innovations from "human capital externalities" that tend to happen when diverse people with various skills and complementary knowledge jostle together in companies, and companies jostle together in cities.

Example of "Development In One Company"

Jane Jacobs uses the development of the 3M company to illustrate how innovation turns mere growth ("expanding old work") into diversified and ramified development ("adding new work") in a process where "one sort of work leads to another" [1969, 53]. The Minnesota Mining and Manufacturing Company started with two proprietors and some workers gathering and processing sands used for abrasive purposes. Then they decided to make sandpaper but had trouble with the adhesives to stick the sand to the paper. After experimenting with adhesives,

⁴ See Leontief 1963 for a discussion of increasing self-sufficiency in a developing economy.

they developed a gummed paper to use as masking tape for painters and eventually a whole line of tapes: "shoe tape, electrical tape, acetate tape, pressure-sensitive adhesive tape (better know as Scotch tape), acetate fiber tape, cellophane tape, printed cellophane tape, plastic tape, filament tape, sound recording magnetic tape, nonwoven synthetic fibers." [1969, 53] Today we could add a host of other spin-off products such as the Post-it notes and magnetic disks for computers.⁵

Other uses of adhesives were not forgotten. The diversification continued with "sandblasting stencils, automotive adhesives, industrial adhesives, marine adhesives, marine calking compounds, tile and construction adhesives, construction compounds." [1969, 53] The original product of sand also sent out its branches on the ramifying tree of products: "coated sand for polishing, then wax and varnish coatings, finely ground paint pigments, roofing granules, nonslip cleats and strips, abrasive cloth, reflective sheeting, reflective compounds, paving materials, and welding fluxes." [1969, 53]

This process in which one sort of work leads to another must have happened millions of times in the whole history of human economic development. [Jacobs 1969, 53]

This is an example of the dynamics of agglomeration that goes beyond increases in "L" and "K" and that goes on inside the expanding black box of "total factor productivity."

Adam Smith and the Industrial Revolution

The sideways jumps from deepened old work to new work in a nearby field were key to the contagious innovation that made the industrial revolution.

All these gains, plus the invention of machines to build machines, came together in the last third of the eighteenth century—a period of contagious novelty. Some of this merging stream of innovation may have been a lucky harvest. But no. Innovation was catching because the principles that underlay a given technique could take many forms, find many uses. If one could bore cannon, one could bore the cylinders of steam engines. If one could print fabrics by means of cylinders (as against the much slower block printing), one could also print wallpaper that way; or print word text far faster than by the up-and-down strokes of a press and turn out penny tabloids and cheap novels by the tens and hundreds of thousands. Similarly, a modified cotton-spinning machine could spin wool and flax.... [Landes 1998, 191-2]

But those who bore cannon may themselves not be interested in steam engines, and those who print fabrics may hardly be interested in printing wallpaper, not to mention penny tabloids and cheap books. This spin-off conundrum will be addressed below.

Adam Smith didn't get it quite right in *The Wealth of Nations*. Deepening the division of labor increases operating efficiency and thus may expand old work but it is not the dynamics of development of new work.

⁵ See Collins and Porras 1994 to update the story of 3M as the "Mutation Machine from Minnesota."

Dividing existing work into tasks is by no means confined to advancing economies. It is also practiced in the most stagnant economies, where men and women spend their entire working lives at very specialized tasks: tapping rubber trees, or herding goats, or loading bananas, or twisting fibers, or dancing in temples, or mining salt, or crushing ore, or carrying baskets of dirt for public works, or cultivating corn and beans. A stagnant economy may lack almost everything, but not division of labor. [Jacobs 1969, 83]

One key to dynamics is when the process of deepening the division of labor in the old work leads to a new type of work, a new branch on the tree. Jacobs illustrates with Smith's own example of pin-making [Smith 1994, Chapter 1]. The story of the improvements in pin-making started on an earlier branch of the tree, the making of wire bristles to card wool. Specialization in making carding combs lead to people "who bought iron ingots from smiths, drew them into wire, made the wire into bristles and sold the bristles to cardmakers" [Jacobs 1969, 82]. But the operations of making the shaft of the wire bristle were the same as those needed to make the shaft of a pin. Hence some bristle makers could branch off with the further steps to add heads to the wire bristles to make pins. "They were adding a new complexity, pin making, to an older simplicity, bristle making. From this addition came the rest of the divisions of labor in pin making that Smith describes" [Jacobs 1969, 82].

The story of the *dynamics* of development is not the static efficiency of greater specialization but the branching off of new kinds of work. Carrying the pin-making story further, about fifty years after Smith's exposition, the hand-making of pins was rendered obsolete in a stroke by a pin-making machine. But that machine did not develop from the specialization of labor in the pin-making business but from a new branch on another tree, a new application made by a designer of machines for other industries.

Climbing Jacobs' Ladder: Cities Developing on Each Other's Shoulders

In addition to providing a fruitful view of development emphasizing diversification, Jacobs has also shown a new way to reopen and recast the old discourse about import replacement (which she, however, sharply separates from the forced and state-led programs for "import substitution").

Cities can grow through a process of dynamic interaction with each other through direct or indirect rivalry. To play in the "game," a city must produce something which it can export—perhaps based on its natural endowment. That is its "challenge" to other cities. The export earnings can then buy imports from other cities that were not produced in the given city—which is its challenge. If the other cities were not too advanced, then the import will present a plausible challenge to be replaced through learning and improvisation and perhaps improved upon by the city. Since the wealth to buy the imports might have been earned productively (not a gift), the city might already have some productive capacity that might begin to improvise and differentiate to produce and replace the import.

In the meantime, the other cities might be replacing the original exports of the city; its temporary advantage might be competed away. Now the domestic and perhaps improved version of the originally imported products can then be re-exported perhaps to the original supplier city or more

likely to other cities that are less developed or have different specializations. The new export earnings will then purchase other more challenging imports, and the process can repeat itself ratcheted up at a higher level. In this matter, a diversified group of innovative cities can through trade learn from each other and not only grow but *develop* "on each other's shoulders"—which we might call "climbing Jacobs' ladder."

It should be particularly noted that the Jacobs' ladder mechanism works best between competitors at roughly comparable level of development.⁶ "Science fiction" imports from advanced countries would stop the rivalrous process in the same way that allowing a heavyweight to box in a lightweight class would stop the rivalry and stop the associated process of learning and improvement through competition—leaving aside any other damages. Enforcing "level playing field" competition between "heavyweights" and "lightweights"—that is, between advanced and underdeveloped countries—would be tantamount to "kicking away the ladder" [Chang 2002] that the developing countries could climb.

Some Policy Implications of Jacobs' Analysis of Development

The Spin-off Conundrum of Multiproduct Diversification

Ordinarily the owners or managers of a large firm would like to own or control a new product line to reap the rewards. But the nearby product is "off" of their original line of products. Expertise in rather new or different products is not what got the managers where they are so they may have limited enthusiasm for such new directions. It may require attention to a new set of customers and may require some unfamiliar knowledge and inputs. Managers would rather "stick to their knitting" in the business they know (e.g., bristle-making) than "wander off" into some other business (e.g., pin-making).

Picture, for example, a large manufacturer of metal dies whose abrasive-sand department has taken on the work of making sandpaper and masking tape. The personnel department has added the service of supplying part-time office workers to banks and publishers. One group of machinists has added the manufacturing of toy cars. Another group of machinists has added the manufacturing of surgical instruments. Still another group is working on a machine to improve bookbinding. The shipping department has added the manufacturing of crate linings made from foam rubber and is also making shoe inner-soles from the scraps. [Jacobs 1969, 72]

Management would become a nightmare in this "strange hive." Each new kind of work would have its own customers, input and space needs, financing and staffing requirements, and growth rate all not in any coordination with the original work of the company. It probably is not worth the distraction to the original company. In advanced economies, some of these opportunities might be pursued with a multidivisional structure [e.g., Chandler 1990], but in developing countries managerial attention span and the economies of scope may be rather limited. If the company is a subsidiary or branch of a foreign or multinational firm and is intended to produce the foreign company's products for the local market, then this sort of "irrelevant diversification" is even more unlikely.

⁶ See Chapter 10 "Why Backward Cities Need One Another" in Jacobs 1984.

But it is a different story to some local middle managers and skilled workers who could see the new work as their own break-away or hived-off enterprise. Spin-offs and break-aways to fill nearby product niches are a positive externality of the mother firm and hence under *laissez-faire* conditions may well be under-supplied. It may be useful to recall that Nature fosters growth not simply or even primarily by fostering the growth of existing organisms but by constantly seeding new life.

This is the conundrum of multiproduct diversification or the "spin-off conundrum" at the heart of the problem of business innovation and development. Once a company learns the technology W to produce X, the economically rewarding path and "path of least resistance" is probably to continue in the same groove (or rut) to produce more and better X instead of using the technology W to produce non-competing products Y and Z.⁷ Under conventional conditions (e.g., limited economies of scope), spin-offs to pursue new work and to fill adjacent product niches will tend to be under-supplied—even though they will still occur willy-nilly. This is a problem even in developed economies, but it is particularly severe in developing countries where business conditions may be less welcoming but where such spin-offs would be important spillover effects of otherwise enclave operations. Enclave firms could be encouraged to spin off locally rooted companies which, in turn, could have more children to better populate the niches in the local economic environment. Cities and their regions that resolve the conundrum of multiproduct differentiation will have taken large strides along the road to development.

Conventional approaches to fostering growth tend to focus on vertical linkages, upstream or downstream links within the same industry. Or they might focus on geographical expansion within an industry. Jacobs' focus on growth through diversification adds a third dimension which might be a "hundred dollar bill left on the sidewalk" in the conventional approaches, i.e., multiproduct diversification perhaps within one multidivisional company (e.g., 3M) but probably through programs of assisted spin-offs and break-aways.⁸ While Jacobs does not focus on these policy questions, there are several examples that might be mentioned.

⁷ The problem of using new knowledge (either an innovation or new imported knowledge) to produce other products off the main line of business is related to what Norbert Wiener called the "inverse process of invention." Ordinarily we think of starting with a problem and then making an innovation or invention to solve the problem. But with the new "solution" in hand, we might then search for what other problems it might be able to solve. "It is just as truly a work of invention or discovery to find out what we are able to accomplish by the use of these new tools as it is to search for the tools which will make possible a specific new device or method." [Wiener 1993, 91]

⁸ Franchising uses the principle of replicating the "DNA" of an existing operation into a non-competing area. The heavy legal infrastructure of franchising is needed for the original company to capture the rents from the offspring so that the market would support this activity. But public policy in a developing country might be able to foster this sort of replication, a sort of 'light-touch franchising' to bridge the market failure, without setting up a full master franchise or requiring that infrastructure ahead of time. The salary of a potential entrepreneur might be subsidized so that the apprentice manager could learn the business on the job with an existing manager on the condition that the new entrepreneur set up in a non-competing zone. The existing business would not only get some useful work out of the apprentice manager paid for by the public subsidy, but would later have a potential partner in a nearby region.

The Thermo Electron Group

One interesting example of systematic spin-off promotion is the Thermo-Electron Group in and around Boston.⁹ The original company Thermo-Electron was started by an MIT physics professor, George Hatsopoulos, in 1956. Once a company has mastered a technology to produce one product, there are many nearby products that beckon to be produced. Thermo Electron established the principle that new nearby products would be produced in new companies that were "spin-outs" from the original company. The mother company would keep a majority of the shares (to address the incentive problem) but the other shares would be held by the people in the spin-out or would be sold to the public. Operational control would be in the hands of the spin-out company whose name would always begin with "Thermo" to signify membership in the Thermo group (with over 60 companies listed on their website). Now the children have begun to have children since the ramification through spin-outs is a principle for all the companies of any generation.

The Thermo group operates more like a publicly traded venture capital group than a traditional public company. "In their world, entrepreneurs are encouraged to develop their ideas inside one of Thermo's existing companies, and when they are ready Thermo goes to market to finance them." [Bailey and Syre 1996, 45] When asked why others have not copied his ideas, Hatsopoulos said:

"People who head large companies are not venturesome enough. The CEOs of established companies are afraid to lose control because we are turning a lot of decision-making over to the individual manager." [quoted in Bailey and Syre 1996, 45]

The example of the Thermo group is quite instructive on several counts. It shows one way that the problem of fostering spin-offs (or "spin-outs") can be addressed. But it also shows the severity of the incentive problem since the Thermo example has not been imitated even in the entrepreneurial hothouse of Boston's "Route 128." Corporate management often wants to expand its own empire with new products or not do it at all. There is one Microsoft company, not 50 or 100 firms in a Microsoft group.

The Mondragon Cooperative Group

In the Basque country of northern Spain, there is today a sophisticated complex of over a hundred industrial cooperatives centered in the town of Mondragon.¹⁰ The companies known collectively as "Mondragon Cooperative Corporation" produce a rather full variety of high-valued added consumer products, intermediate goods, and capital goods including the first robots and computer numerically controlled (CNC) machinery designed and built in Spain. Since the firms are all cooperatives, it was all done with no foreign ownership. The group started with a single company in the mid-50s producing a kerosene heater. Then it systematically started filling out the backward linkages, producing the machines to make the heaters and then the machines to make those machines. Through multiproduct diversification, it started producing

⁹ See <http://www.thermo.com/>; Bailey and Syre 1996.

¹⁰ See http://www.mondragon.mcc.es/ingles/menu_ing.html For details see the account by a preeminent American organizational theorist and his wife [Whyte and Whyte 1991] or by one of the founders [Ormaechea 1991].

other consumer durables (stoves, refrigerators, and washing machines) and all the things to produce those things. Each bottleneck called forth new energies to solve problems, e.g., a bank to help finance new enterprises, an applied technological research institute to systematically learn new technologies and turn them into new products, a consulting company to help new firms start, an insurance company for members, and a polytechnic university.

Since the firms were cooperatives and, as a group, had the express goal of developing good jobs in the Basque country, the conundrum of fostering spin-offs and break-aways was "socialized" within the group [see Ellerman 1984]. The original company did not have the option of "owning" a spin-off and being distracted by it since the latter would also be a cooperative that would have to walk on its own two feet—within the group. Thus the headquarters of the whole group encouraged groups within existing firms to coalesce around ideas to produce adjacent products in a spin-off. The managers and workers might be from a village or small region without much industrial development so by doing the spin-off near their homes they satisfied both economic and social goals. Since the spin-off process was carried out in an organized and socially approved way, precautions could be taken so that it did not disrupt the original mother firm. It became part of how the group evolved.

Aside from these 'sideways' spin-offs, the Mondragon group pursued with conscious deliberation the unbalanced growth path of filling out backward and forward linkages. Each new firm filled a pressing need not just to produce an input previously supplied from elsewhere but to learn the technologies necessary to produce the input. By so doing, the knowledge became a collective good within the group where it could then ramify into other nearby product areas. By having broader social goals for the region, the Mondragon group in effect internalized what would have otherwise been under-supplied activities with positive externalities.

Township-Villages Enterprises in China

The spin-off theme is also related to the story of the township-village enterprises (TVEs) in China which over the last quarter century have driven the largest growth episode in modern history. What were the historical causes of this remarkable development of rural industry? It was hardly the deliberate result of communist ideology which had always emphasized reaping returns to scale in huge urban industrial agglomerations. The success of small and medium-sized firms in rural China was a double-barreled surprise to the authorities. And it is a story that will take us back to the migration theme.

Historically, one source came from the peasants that tried to escape the rural chaos of the Civil War by migrating to the cities such as Shanghai. After Mao's Revolution in 1949, many of these peasants, who had acquired some industrial skills in the cities, return-migrated to their villages in the hopes of getting ownership of the land. But they were not much good at agriculture and the land was soon collectivized anyway, so they starting setting up small repair shops and small manufacturing workshops to apply their advantage in industrial skills. In the Jiangsu Province around Shanghai, these collective-brigade enterprises started an important precedent for rural light industrial development.

In the next few decades, large-scale political movements swept over China such as the Great Leap Forward, the Sino-Soviet Split, and the Cultural Revolution. Although each upheaval had

its own genesis, they all worked to decentralize industry away from the cities and to create a more regionally self-sufficient cellular economy particularly in the large coastal provinces (each one comparable to a fair-sized country elsewhere).

The collective-brigade enterprises were not great successes but there was learning going on. When liberalized agricultural reforms picked up steam in the late 70s, there was the supply of workers, the demand for outputs, and the learning from experience to have a rebirth of the collective-brigade enterprises as the township-village enterprises. With internal liberalization, more trade developed between the provinces and this allowed the TVEs to reap gains from specialization.

This evolution of the TVEs is instructive; it corroborates a fundamental point emphasized by Jane Jacobs based on western experience. Rural development starts in the cities; "city economies create new kinds of work for the rural world, and by doing so also invent and reinvent new rural economies." [Jacobs 1969, 39] Rural development schemes should focus on urban-rural linkages which includes "imports" into rural areas of industrial skills and inputs for production as well as "exports" back to urban areas if the rural off-farm firms are to grow beyond micro-shops servicing local needs.

Just as Chinese factories might buy old machinery from developed countries, so rural industries in China might get their start using old machinery from urban Chinese factories. To help shed urban labor and deconcentrate industry, some urban factory workers from a small region not too far from an urban center, might be encouraged to take some of the older machinery and set up a TVE in their old village and then subcontract to their old factory.

This sort of arrangement has some precedent in other parts of the developing world.

This new system of subcontracting with a large number of small, decentralized workshops (*maquilas*) and household units is well adapted to the 1990s' environment of market uncertainties and the tremendous growth during the 1980s of the informal economy....

Wood products, textiles and clothing, and shoes and leather goods are commonly produced under subcontract by such enterprises. The shoe industries around Nova Hamburgo in Brazil (Sabel [1986]) and León in Mexico (de Janvry and others 1989) are organized on that basis, with many subcontracting workshops and households located in the surrounding rural areas.

Support to these enterprises in the form of credit, infrastructure, simple technology, and the development of skills may be one of the most effective way of promoting the revival of competitive industries and their location in rural areas. [de Janvry and Sadoulet 1993, 269]

Middle managers and groups of workers from a certain region could be encouraged to spin-off some of the older machinery and set up a subcontracting operation in their home region or town. The subcontracting work would help get it going, but it could also diversify into other niches to spur local development. At present, urban factories have little incentive to encourage such a

program. As long as workers show up at their doors, urban factories do not bear the costs of urban congestion or rural decay. Public action is required. This would not only sponsor some return-migration but would, of greater importance, reduce the migration flows to the mega-cities as some rural industry took root in the countryside.

Concluding Remarks

The general policy theme emerging from Jacobs' work on business development is that the best way for governments to foster development is to catalyze how "one thing leads to another" or how "one sort of work leads to another"—rather than try to start something from the beginning. The potential incubators for new businesses are the existing businesses.¹¹ Indeed, most entrepreneurs learn the ropes in an existing company before striking off on their own to become "the head of a chicken instead of the tail of an ox."¹² Environments that realize this potential such as Taiwan or Silicon Valley are sites of vigorous growth. In general, Jane Jacobs' analysis of development suggests that the systematic promotion of spin-offs, e.g., through a Thermo-like model, a Mondragon-like model, a TVE model, or just through a Taiwan-style business environment, should be a powerful mechanism for development.

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¹¹ Leff [1979] suggests that a "Group" of companies in a developing country united perhaps by family ownership might play this role.

¹² An expression in Taiwan describing employees who leave to start their own businesses.

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