

THE ECONOMY THAT KEEPS BECOMING · CHAPTER FIVE

The Valley and the Highway

Chapter Five of The Economy That Keeps Becoming

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The Valley and the Highway
Chapter Five of The Economy That Keeps Becoming

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A NOTE BEFORE YOU READ

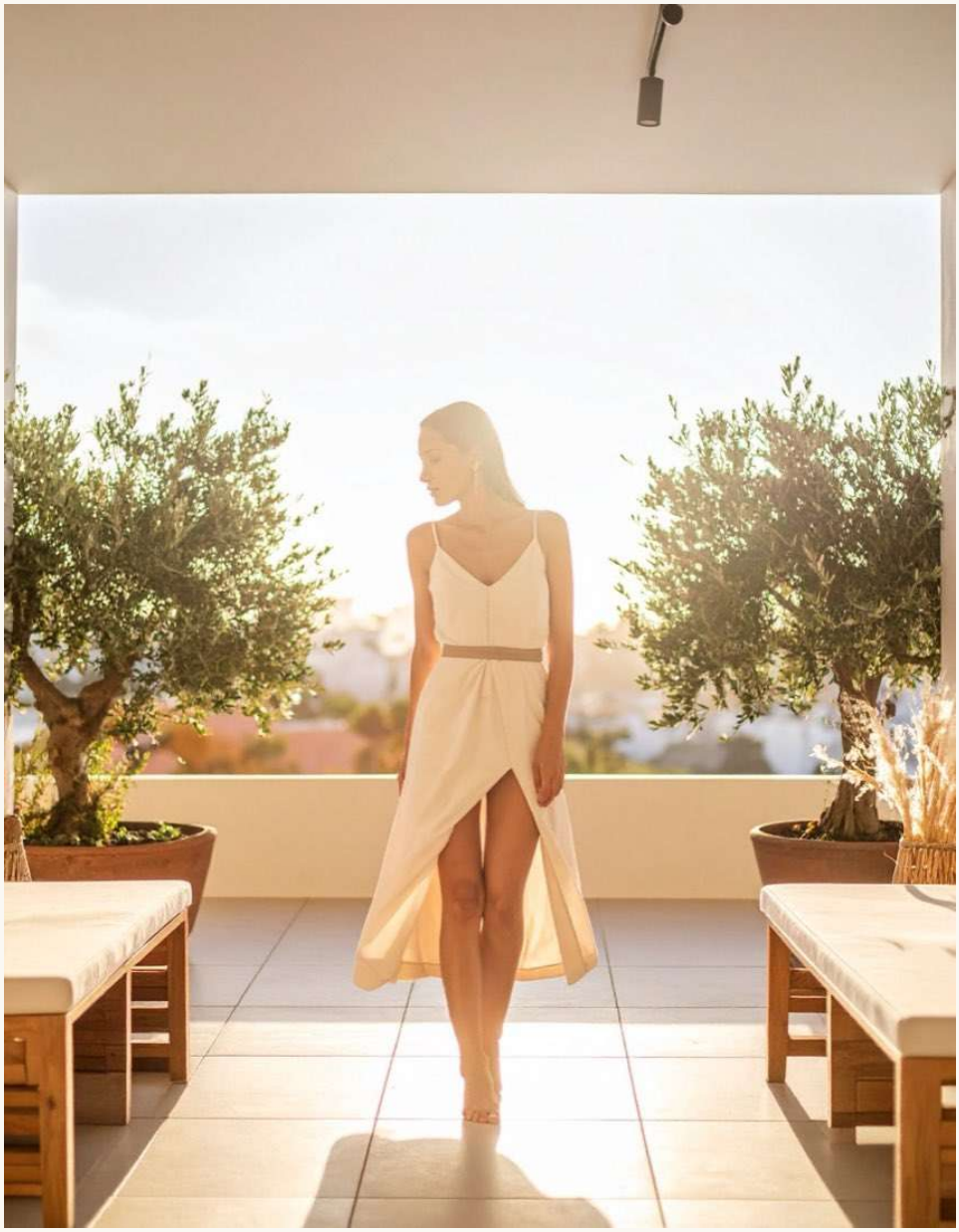
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ABSTRACT

At the start of the 1980s there were two places in the United States that a reasonable observer would have named as the centres of the electronics industry. One was the Santa Clara Valley south of San Francisco, which had been called Silicon Valley for about a decade. The other was the ring of suburbs around Boston strung along Route 128, a highway built in the 1950s, where a cluster of minicomputer makers had grown out of the laboratories of the Massachusetts Institute of Technology and the military research of the Second World War. On most measures an investor would have used at the time, the Boston region looked at least as strong as the Valley. It had older universities, deeper pools of engineering talent, established firms with famous names (Digital Equipment Corporation, Data General, Wang Laboratories, Prime Computer) and a record of turning research into products. Both regions had grown on defence contracts. Both had access to venture capital. Both were full of very able people.

CHAPTER FIVE

The Valley and the Highway



The Valley and the Highway

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Two regions in 1980

At the start of the 1980s there were two places in the United States that a reasonable observer would have named as the centres of the electronics industry. One was the Santa Clara Valley south of San Francisco, which had been called Silicon Valley for about a decade. The other was the ring of suburbs around Boston strung along Route 128, a highway built in the 1950s, where a cluster of minicomputer makers had grown out of the laboratories of the Massachusetts Institute of Technology and the military research of the Second World War.

On most measures an investor would have used at the time, the Boston region looked at least as strong as the Valley. It had older universities, deeper pools of engineering talent, established firms with famous names (Digital Equipment Corporation, Data General, Wang Laboratories, Prime Computer) and a record of turning research into products. Both regions had grown on defence contracts. Both had access to venture capital. Both were full of very able people.

By the early 1990s the two had diverged. Both had been hit hard in the 1980s: the Valley's semiconductor makers by Japanese competition in memory chips in the middle of the decade, Route 128's minicomputer firms by the arrival of the personal computer and the workstation toward its end. The Valley recovered and went on to produce the next generations of the industry. Route 128's leading firms struggled. Wang filed for bankruptcy protection in 1992; Digital, once the second-largest computer company in the world, was sold to Compaq in 1998.

The question of why is the subject of one of the most widely cited books about an industrial region, and it is the first case in this book because it shows the ideas of the earlier chapters at the scale of a whole regional economy, over thirty years, with the evidence gathered by someone who went and asked.

Saxenian's answer

AnnaLee Saxenian, then at the University of California, Berkeley, published *Regional Advantage: Culture and Competition in Silicon Valley and Route 128* in 1994.[36] She had spent years interviewing engineers, managers, founders and investors in both regions, and she set out to explain the divergence without reaching for the usual answers.

The usual answers were about inputs. The Valley had better weather, or Stanford, or more venture capital, or more defence money at the right moment. Saxenian did not dismiss any of these, but she argued that none of them explained the difference, because Route 128 had comparable inputs. What differed was the way the parts of each region were connected to one another.

Route 128, as she described it, was dominated by a small number of large, vertically integrated firms. Each tried to do most things itself: design its own chips, build its own components, write its own software, train its own people. Information was held inside the firm. Engineers tended to stay at one company for a long

time, and loyalty was expected and rewarded. Relations between firms were formal and often guarded. The region was, in her phrase, a collection of independent firms that happened to be near one another.

Silicon Valley, by contrast, was organised as a network. Firms specialised and bought from one another. Engineers moved between companies frequently, carrying knowledge with them, and the boundaries between firms were porous. People who had worked together at one firm met at another, or at a bar, or at a trade association, or in a new venture founded by colleagues who had left. Failure was common and not shameful; a failed start-up released its people and ideas back into the network. Information moved fast, through relationships rather than through formal channels.

When the shocks of the 1980s arrived, the two structures responded differently. A vertically integrated firm on Route 128 that had bet on a particular architecture found it hard to change course, because everything inside the firm had been built around that bet. In the Valley, the same shock released people and ideas into a network in which they recombined quickly, and new firms formed around the new opportunities. The region as a whole adapted even when individual firms did not.

Read with Arthur

Read with the ideas of chapter 2, Saxenian's account is a story about loops.

Both regions had strong increasing returns. In both, success attracted talent, talent produced products, products produced revenue, revenue funded more success. The difference was in what the loops were made of and where they ran.

On Route 128, the reinforcing loops ran mostly inside firms. A firm's success deepened its own capabilities, its own supplier relationships and its own culture. This made each firm very good at what it already did, and it made each firm locked in to what it already did, in exactly the sense Arthur described: its future was increasingly determined by its past, and the structure that made it strong also made it inflexible.

In the Valley, many of the reinforcing loops ran between firms, through the movement of people and information. Success anywhere in the network strengthened the network, which made success elsewhere more likely. The region's capabilities were held less in any single firm than in the pattern of relationships among them. When one firm locked in to a failing design, the region did not, because the region's knowledge was not stored in that firm alone.

There is a useful point here about the level at which lock-in happens. Arthur's model describes a market locking in to one technology. Saxenian's case shows that organisations and regions can lock in to a structure: a way of holding knowledge, of relating to suppliers, of treating people who leave. A region of closed firms can be very productive for a long time and then unable to change; a region of open loops can look disorderly and wasteful and then reorganise itself in a few years.



Read with the living-systems lens

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Read with the living-systems lens

Chapter 4 argued that the distinctive question of the living-systems reading is what each loop carries, and whether feedback reaches the people who act. Saxenian's case answers both questions with unusual clarity.

The loops in the Valley carried information, and they carried it to the people who could use it: engineers, who heard within weeks from former colleagues what was working elsewhere. The feedback was short and it was felt. On Route 128 the equivalent information travelled, if at all, upward through a firm's hierarchy

and then down again as a decision, a route that was slow and that filtered out much of what an engineer would have wanted to know.

Santa Anna's book names the principle as one of its design rules for vitality-centred organisations:

> *Organizations that suppress feedback — through hierarchy, blame cultures, or information hoarding — create the economic equivalent of a body that can't feel pain: they lose the ability to adapt and self-correct.*[37]

The passage is written about the inside of an organisation. Saxenian's case shows it holding at the scale of a region. Route 128 did not lack intelligence. It lacked circulation. Its information was held, as capital is held, in reserves that could not easily move to where they were needed.

The Luminous 100, the house's upgraded set of management frameworks, makes the same point about Stafford Beer's Viable System Model, which describes the functions any self-maintaining system must perform. Its upgrade reads every unit of an organisation as itself a viable system, nested inside larger ones:

> *every team is a viable system nested within a viable department nested within a viable organization nested within a viable industry*[38]

Read this way, the Valley was viable at more levels at once. Its firms could fail without the region failing. Route 128's viability was concentrated in a handful of large firms, and when they faltered there was less beneath them to carry the region's capability forward.



A law that kept the loops open

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A law that kept the loops open

One part of the story deserves its own section, because it shows a rule nobody designed for the purpose shaping a whole region's dynamics.

In 1999 the legal scholar Ronald Gilson published an article in the *New York University Law Review* titled "The Legal Infrastructure of High Technology Industrial Districts: Silicon Valley, Route 128, and Covenants Not to Compete".[39] Gilson took Saxenian's account and asked what might explain the difference in how often engineers moved between firms. His answer pointed to a provision of California law, section

16600 of the Business and Professions Code, under which contracts restraining a person from engaging in a lawful profession are generally void. In practice, this meant that California courts would not enforce most covenants not to compete: an engineer who left a Valley firm could go to work for a competitor the next week. Massachusetts courts, by contrast, generally enforced reasonable non-compete agreements.

Gilson's argument was that this difference, which predated the electronics industry and had nothing to do with it, may have helped produce the high mobility of Valley engineers, and with it the knowledge spillovers that Saxenian described. Later empirical work has tested the idea, with mixed and debated results, and Gilson himself presented it as a hypothesis about one contributing cause rather than as the whole explanation. It is cited here because the mechanism, whatever its size, is exactly the kind of thing complexity economics teaches a reader to look for: a small, old rule in the background, which changes the cost of moving between two points in a network, and which, compounded over thousands of individual careers, shapes the pattern of a regional economy.

The general lesson for a leader is close to home. Every organisation has rules, written and unwritten, that set the cost of information and people moving across its internal boundaries. Who may talk to whom without permission. Whether a person who moves between teams is treated as a loss or a gain. Whether a project that ends is treated as a failure to be hidden or a release of knowledge to be shared. These rules rarely appear on any strategy document, and they may matter more than most of what does.

What the case cannot show

The case is strong and it should not be overstated. Three limits are worth stating plainly.

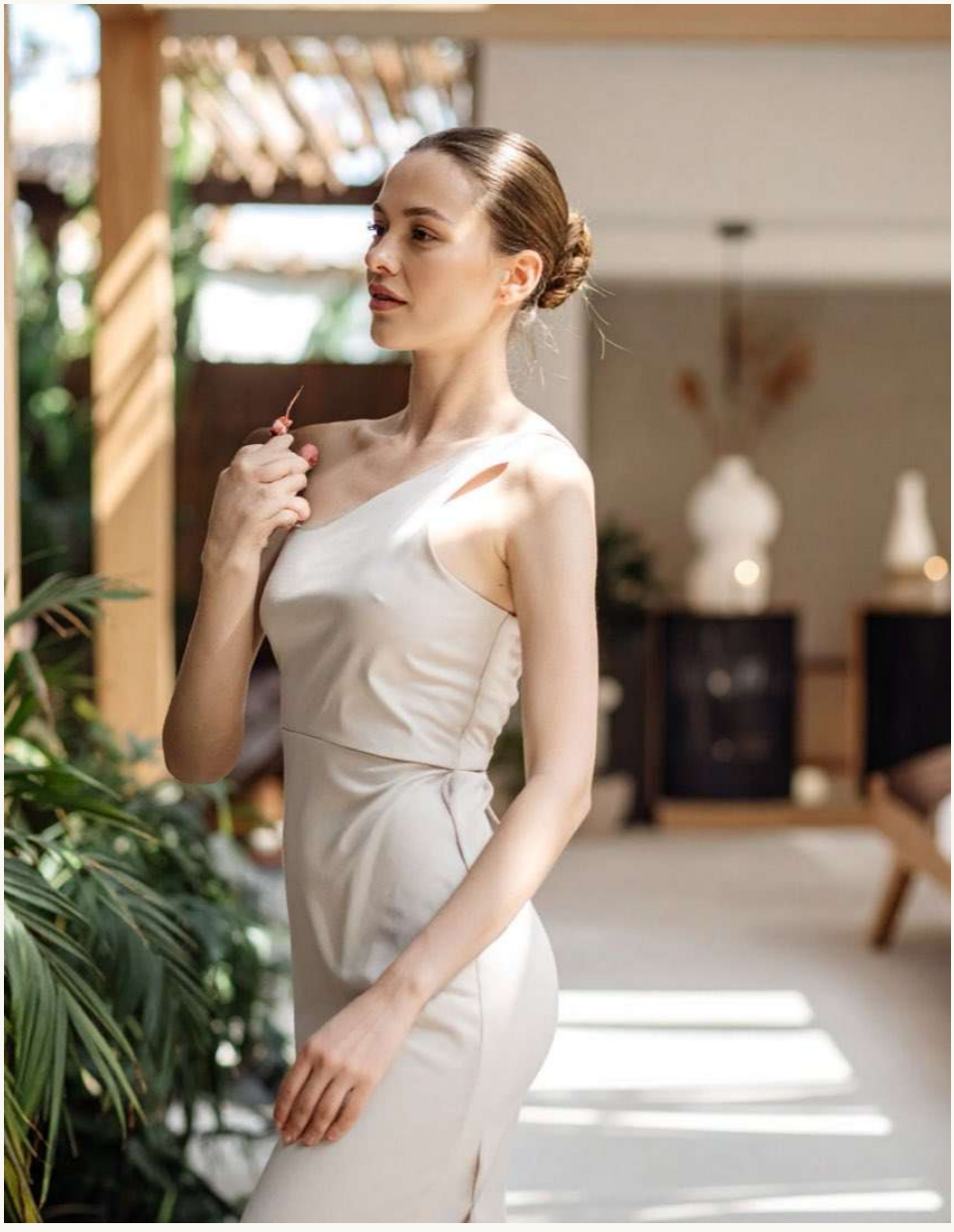
First, it is two regions. A comparison of two cases can suggest a mechanism; it cannot prove one. There are many differences between Northern California and Massachusetts, and Saxenian's critics have pointed to several she gave less weight to, including the particular timing of the personal computer and the very large flows of venture capital into the Valley in the 1990s.

Second, Saxenian's account is interpretive. It rests on interviews and on her reading of how two cultures worked. It is careful and widely respected, but it is not a measurement of information flows, and a reader should hold it as a well-argued account rather than as a quantified result.

Third, the outcome was not inevitable. Route 128 did not disappear; the Boston region later became a strong centre for biotechnology and other industries, and some of its firms adapted well. The divergence Saxenian described was real for the computing industry in a particular period. It is not a law about all regions for all time.

Paul Krugman's 1991 paper on increasing returns and economic geography, in the *Journal of Political Economy*, offers a useful frame for holding the case.[40] Krugman showed formally how increasing returns and transport costs can produce a core-periphery pattern, in which industry concentrates in one region rather

than spreading evenly, and how small differences in starting conditions can decide which region becomes the core. His model is about where industries cluster, not about the internal culture of a cluster, so it complements Saxenian rather than confirming her. Taken together they suggest two levels of path dependence: history decides where a cluster forms, and the structure of the cluster's loops decides how well it adapts once formed.



The finer points for a leader

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The finer points for a leader

Five practical consequences follow, and each can be tested in an ordinary organisation within a quarter.

Map where your learning is stored. Ask, of each important capability in the organisation, where the knowledge that sustains it actually lives. In one person? In one team? In a set of documents nobody reads? In relationships with three suppliers? A capability stored in one place is a Route 128 capability: strong until that place falters. A capability held across a network of people who talk to one another is closer to the Valley's.

Price the cost of movement. For people moving between teams, and for information moving between them, ask what it costs today in time, permission and reputation. If a capable engineer who moves to another team is quietly marked as disloyal, the cost of movement is high, and the organisation is paying for it in learning it never sees.

Treat endings as releases. When a project ends, a team is disbanded or a product is retired, the people and knowledge involved go somewhere. In a closed system they go into a drawer. In an open one they recombine. A short, honest retrospective, published to everyone who might use it, and a deliberate effort to place the people where their knowledge is wanted, turn an ending into a release.

Specialise and connect, rather than integrate. The case for doing everything in-house is usually made on grounds of control and cost. Saxenian's case adds a cost the usual analysis misses: integration closes loops that might have brought in learning from outside. This does not mean outsourcing everything. It means asking, for each activity, whether the organisation learns more by doing it or by connecting to someone who does it better and talking to them often.

Watch the rules nobody designed for this. Every non-compete clause, approval policy, travel budget, confidentiality default and meeting convention sets the cost of some flow. Most were written for good local reasons. Some, compounded over years, may be shaping the organisation's capacity to adapt more than any strategy. Chapter 3's Lock-In Test applies to them as well as to technologies.



The household reading

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The household reading

The same distinction holds for one person's working life. A career built entirely inside one organisation, with all of its knowledge and relationships held there, is strong while that organisation is strong. A career that also maintains open loops (former colleagues kept in touch with, a skill practised in a community outside work, a habit of sharing what one learns) is less efficient in any single year and much better at reorganising itself when a shock arrives. Neither is wrong. The question is whether the balance is chosen or merely inherited.

The two regions now

Saxenian closed her book with an argument rather than a forecast: that regions, like firms, can learn, and that the institutions and habits which keep loops open can be built deliberately. That argument is this book's as well. The Valley's open network was not designed by anyone. It emerged, partly from a legal accident, partly from the culture of a few early firms, partly from luck. But once its mechanism is understood, a leader does not need to wait for luck. The cost of movement, the treatment of endings, the place where learning is stored and the rules that set the price of a conversation are all within reach.

The highway is still there, carrying commuters past buildings that once held the most famous computer companies in the world. So is the valley. The difference between them, in the years that mattered, was not what either region had. It was how what each had was allowed to move.

The Tool: The Cluster Reading

For any network you belong to or lead: a firm and its suppliers, a set of teams, an industry association, a professional community, a neighbourhood of small businesses. Two hours, with three people who know the network from different positions.

1 · The network

Name it, and draw its edge: who is inside?

The main nodes (firms, teams, people), up to twelve:

2 · Where learning is stored

CAPABILITY THAT MATTERS	WHERE THE KNOWLEDGE LIVES (ONE PERSON, ONE TEAM, DOCUMENTS, RELATIONSHIPS ACROSS SEVERAL NODES)	IF THAT PLACE FAILED TOMORROW, WHO ELSE COULD CARRY IT?

3 · The cost of movement

FLOW	WHAT IT COSTS TODAY (TIME, PERMISSION, REPUTATION)	WHO SET THAT COST, AND WHEN	WOULD YOU SET IT THE SAME WAY TODAY?
A person moving between nodes			
Information moving between nodes without a manager			
A failed project's lessons reaching others			
An outside expert talking to an inside team			

4 · Loops inside, loops between

Three reinforcing loops that run inside a single node:

Three reinforcing loops that run between nodes:

Which set is stronger? What would happen to the network if the strongest single node faltered?

5 · Rules nobody designed for this List up to five rules (contracts, policies, defaults, habits) that change the cost of movement in the network, though they were written for another purpose.

…

...

...

Which one could be changed by the people in this room? · owner: · date:

6 · One release

One recent ending (a project, a product, a team) whose knowledge went into a drawer:

What it would take to release it now:

A note on method

The dates for Wang Laboratories' bankruptcy filing (1992) and Digital Equipment Corporation's sale to Compaq (1998) are matters of public record and are given from standard business histories; they were not re-read from court or company filings for this book.

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