

THE EMBEDDED MARKET · CHAPTER SEVEN

The Fire at Kariya

Chapter Seven of The Embedded Market

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A NOTE BEFORE YOU READ

This work is offered for education and leadership development. It is not legal, financial, accounting, investment, medical or psychological advice; take the advice of a qualified professional who knows your circumstances. Companies and events are described from the public record as the author understands it; characterisations are the author's analysis. Examples are illustrative, and no particular outcome is promised to any reader.

ABSTRACT

On Saturday the first of February 1997, fire broke out at one of the plants of Aisin Seiki, a supplier to Toyota in Aichi Prefecture, Japan, whose works are centred on the city of Kariya. The plant made proportioning valves, known in the trade as P-valves: small brake parts, cheap, unglamorous, and used in every vehicle Toyota made. Aisin, which the management scholars Toshihiro Nishiguchi and Alexandre Beaudet describe as one of Toyota's most trusted suppliers, was the sole source. Toyota ran on just-in-time production, which means it held almost no inventory. When the fire stopped the line at Aisin, Nishiguchi and Beaudet report, only two or three days' worth of P-valves was on hand. The machines that made them were destroyed. In the textbook account of supply-chain risk, this is the scenario every lecture warns about: a single source, no buffer, a part in everything, gone overnight. The expected result is weeks of lost production across the whole group.

CHAPTER SEVEN

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A Saturday in February

On Saturday the first of February 1997, fire broke out at one of the plants of Aisin Seiki, a supplier to Toyota in Aichi Prefecture, Japan, whose works are centred on the city of Kariya. The plant made proportioning valves, known in the trade as P-valves: small brake parts, cheap, unglamorous, and used in every vehicle Toyota made. Aisin, which the management scholars Toshihiro Nishiguchi and Alexandre Beaudet describe as one of Toyota's most trusted suppliers, was the sole source.[27]

Toyota ran on just-in-time production, which means it held almost no inventory. When the fire stopped the line at Aisin, Nishiguchi and Beaudet report, only two or three days' worth of P-valves was on hand. The machines that made them were destroyed. In the textbook account of supply-chain risk, this is the scenario every lecture warns about: a single source, no buffer, a part in everything, gone overnight. The expected result is weeks of lost production across the whole group.

That is not what happened. "Yet, remarkably," Nishiguchi and Beaudet write, "disaster was averted, and assembly plants were reopened after only two days of shutdown."[27]

This chapter is about how. The answer is not a contingency plan, a stockpile or a contract clause. It is a set of relationships among dozens of firms that had been built for ordinary days and turned out to carry extraordinary weight on a bad one. The fire at Kariya is the second deep case in this book, and it sits on the other side of the ledger from Chapter 5's account of General Motors. There, a market held at arm's length learned too late. Here, an embedded market learned in hours.

Who answered

The response came from firms that had no contract to make P-valves and, in many cases, had never made one. Nishiguchi and Beaudet's account names several. Hundreds of employees of Denso, another large member of the Toyota group, worked on P-valve production. About seventy people at Taiho Kogyo did the same. Twenty-five people at Toyota itself joined in, and hundreds more were sent out to Aisin and to other firms in the effort. The first company to complete a working P-valve, by their account, was Koritsu Sangyo, a supplier with three hundred and twenty employees.[27]

Pause on that last fact. In a crisis that threatened the production of the largest carmaker in Japan, one of the first firms to put a working part on the table was small enough that most of its employees could stand in one room. It had not been engaged to do this. It had, as far as the account shows, no expectation of a large reward for it. It knew enough, and was trusted enough, to try.

The ties among these firms were not all equal or all independent. Toyota, according to the same account, owned about twenty per cent of Aisin, and Toyota made up some sixty-five per cent of Aisin's sales.[27] This was a group with real ownership links and real dependence. Those facts matter for reading the case hon-

estly, and the chapter returns to them. But neither ownership nor dependence explains why a small supplier with no stake in Aisin reached for a drawing it had never been asked to read.

The cost to the wider economy was not trivial. Nishiguchi and Beaudet cite an estimate from Japan's Ministry of International Trade and Industry that output in the transportation-equipment industry fell by 8.3 per cent in February 1997.[27] The fire was a real shock, and it was felt. What the case shows is how much worse it would have been without the response, and why the response was possible at all.

The sentence that matters

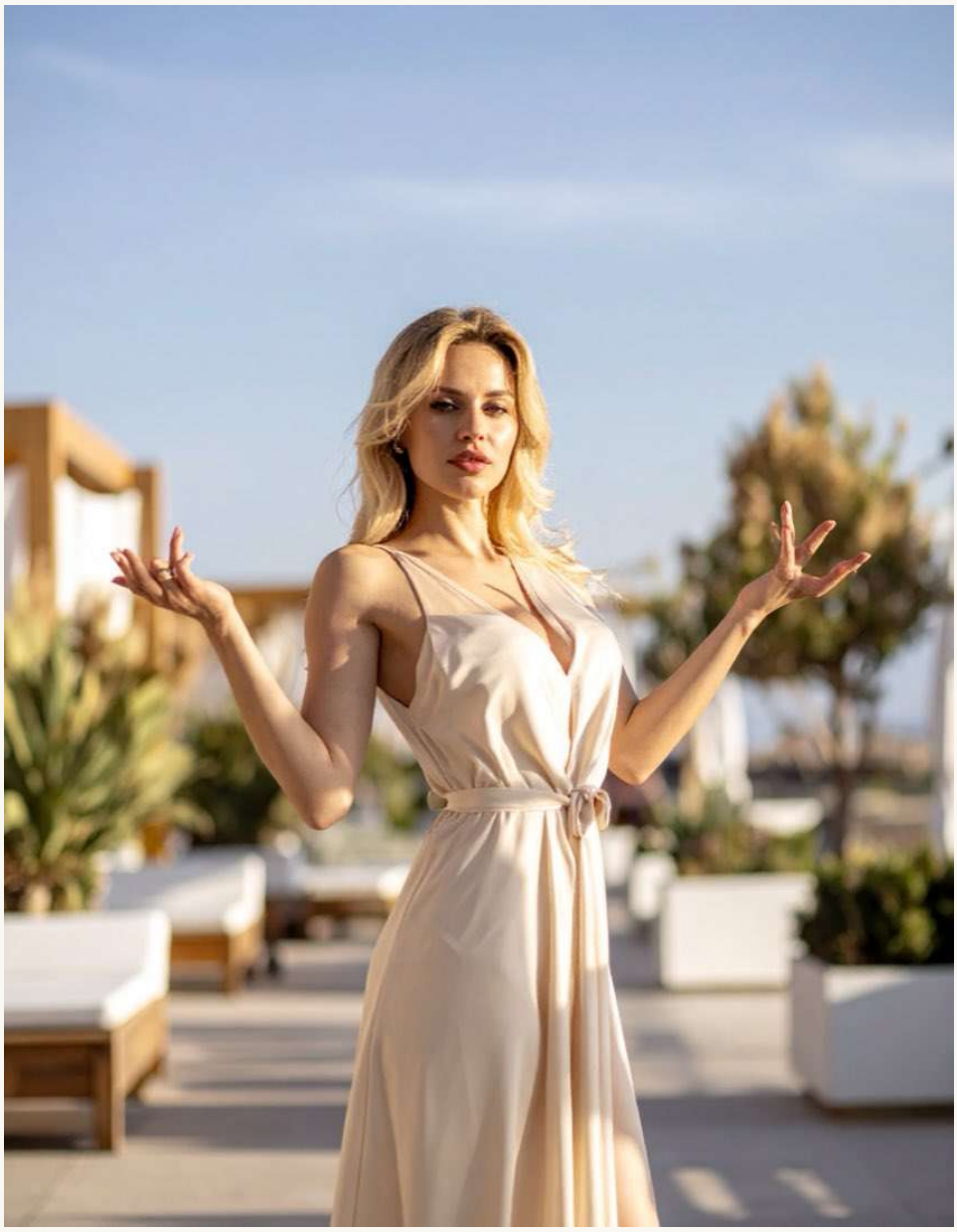
Nishiguchi and Beaudet put the lesson of the fire in a sentence that turns the usual way of thinking about supply chains on its side: "the relationships among a firm's suppliers are equally important."[27]

Most strategy treats a supply chain as a set of spokes. The buyer sits at the hub, and each supplier is a line out to it: a price, a quality standard, a delivery schedule, a contract. The relationships that matter are the ones between the hub and each spoke. In that picture, what suppliers think of each other is somebody else's business.

The fire at Kariya shows the rim of the wheel. The firms that saved Toyota's production were connected not only to Toyota but to each other. They knew one another's capabilities well enough to divide up the work of making an unfamiliar part. They shared drawings and know-how. They trusted that the effort would be recognised fairly afterwards, without needing to settle terms first. None of that could have been arranged by Toyota in two days, from the hub. It had to exist already, in the rim.

The economists Jeffrey Dyer and Kentaro Nobeoka, in a study of Toyota's supplier network published in 2000, describe in general terms how such a rim is built. Their abstract reports that knowledge diffuses more quickly inside Toyota's production network than in competing carmakers' networks, and that suppliers learn more quickly after taking part in Toyota's knowledge-sharing processes. Toyota, they write, solved three problems that usually stop firms from sharing knowledge: it motivated members to take part and share openly while guarding against unwanted leaks to competitors; it prevented free riders; and it reduced the cost of finding and reaching valuable knowledge. It did this by building a strong network identity, with rules for participation and entry. Most importantly, in their account, production knowledge was regarded as the property of the network, and the network had developed institutionalised routines that let knowledge flow in many directions among suppliers.[28]

This chapter uses Dyer and Nobeoka only at the level of that abstract, because the full text could not be checked for this book. At that level they describe exactly what the fire required: many-directional flows of knowledge, a shared identity, and rules that made sharing safe. In Hirschman's terms, they describe an industrial network in which voice had been built into the relationships among the members, not only into the line from each member to the centre.



Reading the fire with exit, voice and loyalty

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Reading the fire with exit, voice and loyalty

Hirschman's three words, which this book has carried since Chapter 2, read the case closely.

Exit was available, and nobody used it. In a purely priced market, a fire at a sole supplier is an exit event. The buyer looks for another source, the supplier loses the business, and the relationship ends on the evidence of a single bad day. Toyota could have treated Aisin that way, and other firms could have treated the crisis as Aisin's problem. Neither happened. The first response was not to leave. It was to help.

Voice travelled sideways. The information that made recovery possible did not mainly move up to Toyota and back down. It moved across: from Aisin to the firms that would make the valves, among those firms as they divided the work, back to Aisin as parts were made. A supply chain in which suppliers can speak only to their customer would have been too slow by days. Here, the edge could talk to the edge.

Loyalty held long enough. Hirschman's loyalty is the attachment that holds exit back long enough for voice to work. In the fire, it held more than exit back. It held back the question of terms. Firms committed people and machines before anyone had agreed who would pay for what. That is only rational if each firm believes, from long experience, that the account will be settled fairly afterwards. Loyalty here was not sentiment. It was credit extended in trust, by firms that had seen such credit honoured before.

Ecstatic Economics states the principle beneath all three in a sentence about every economy, not only Japan's: "Every economic act occurs within a web of relationships." The book means it as a description of how economies have always worked. The fire at Kariya is a demonstration of what that web is worth on the one day it is tested hardest.

Why the web was there

It is tempting to read the case as a story about Japanese culture, or about one exceptional company, and to conclude that it has nothing to teach anyone else. That reading misses the more useful point. The web that answered the fire was built, and the building is describable.

Dyer and Nobeoka's abstract names the materials: identity, rules for taking part, a shared view of knowledge as belonging to the network, and routines that make knowledge flow.[28] Chapter 5 of this book added, from Helper and Henderson's analysis, the relational contract: Toyota's practice of long-term relationships, of letting suppliers earn a reasonable return, and of expecting both sides to sort things out later when a specification changed, rather than reopening the contract.[29] Helper and Henderson are careful to note that this was not a cosy arrangement. Toyota pushed its suppliers hard on cost and defects, reduced the share of those who fell short, and left those who did not improve.[29] Embedded did not mean soft. It meant that hard standards lived inside a relationship that both sides expected to continue.

Put together, those materials explain the fire. Firms that had shared knowledge for years knew what each other could do. Firms that had seen problems sorted out fairly did not need terms before they acted. Firms that thought of production knowledge as the group's did not hoard the drawings. The response was not improvised from nothing. It was the ordinary practice of the network, run at a speed nobody had needed before.

Ammanuel Santa Anna's *Organizational Soul Work* gives a warning that belongs beside this case, because it explains why most organisations would not have known whether their own web was there. "Organizational silence is not the absence of speech," he writes. Organisations are full of meetings and memos. What mat-

ters is whether the particular truths that count, *we can make that part; we have the machine; our people know that process*, travel when they are needed. A supply base can be noisy with weekly calls and still silent about the one thing that would save it in a crisis.

What the case does not show

The fire at Kariya is a famous story, and it has often been told with more confidence than the evidence supports. Five limits keep this telling within its sources.

First, every fact in this chapter about the fire comes from one source, Nishiguchi and Beaudet's 1998 article in the *Sloan Management Review*, which drew on interviews and documents gathered after the event. This book has not checked their underlying data. Where they give no total, for example for the number of firms that took part in making P-valves, this chapter gives none.

Second, the Toyota group was not a market of independent strangers. Ownership links and heavy dependence, such as Toyota's stake in Aisin and its large share of Aisin's sales, gave many firms strong reasons to help that had nothing to do with goodwill. A reader should not conclude that loose networks of independent firms would respond in the same way. The case shows what an embedded network can do. It does not show that embeddedness without shared stakes is enough.

Third, the same feature that saved Toyota also created the risk. A sole source with two or three days of stock is fragile. The network's response repaired the consequences of a design choice that a more cautious buyer might never have made. The lesson is not that single sourcing is safe. It is that if you choose it, the relationships around it are your real inventory.

Fourth, Brian Uzzi's study of New York apparel firms, set out in Chapter 3, warns that networks which are too closed become blind to what lies outside them.[30] A group that can mobilise in hours around a shared drawing can also share the same blind spots. The fire tested the network's ability to act together, not its ability to see a threat none of its members had noticed.

Fifth, Dyer and Nobeoka's study is cited here at the level of its abstract only. Its detailed account of how Toyota's network routines worked could not be checked for this book, and none of those details is relied on.



The finer points, for a leader

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The finer points, for a leader

Few leaders run a supply group the size of Toyota's. Every leader depends on a web of others, suppliers, partners, contractors, neighbouring teams, that will one day be asked to carry more than usual. The fire suggests six points of practice.

Map the rim, not only the spokes. List the organisations you depend on most, and then ask a question most supplier reviews never ask: which of them know each other, and how well? A set of suppliers that have never met each other is a set of spokes. On the day one of them fails, nobody else will know how to help.

Introduce your suppliers to one another. Hold one meeting a year, even an informal one, where your most important suppliers meet each other and hear what each does. Dyer and Nobeoka's abstract points to network identity and rules of participation as foundations. A first step towards both is simply that the members know each other's names and capabilities.

Settle accounts fairly after you have been helped. The willingness of firms to act before terms are agreed rests on a record of being treated fairly afterwards. When a supplier or partner goes beyond the contract for you, pay or recognise it in a way they would call fair, promptly, without making them ask. Every such settlement is an investment in the next emergency.

Keep standards hard and the relationship long. Helper and Henderson's account of Toyota is a useful corrective to a soft reading of embeddedness. The firm pushed suppliers hard and dropped those who did not improve. What made it different from an arm's-length buyer was that the pressure came inside a relationship expected to continue, and that it came with help. Hold your partners to high standards, and be the partner who helps them meet them.

Treat know-how as something to circulate. Ask which of your own improvements could be shared with suppliers or partners without real harm to you. A network in which knowledge moves in many directions is one where the knowledge needed in a crisis is already in more than one place. *Ecstatic Economics* reads the hoarding of information, and its circulation, as one of the clearest signs of whether an economic web is alive.

Rehearse the bad day. Choose one single point of failure in your operations and ask the people who depend on it, and the people who could replace it, what they would do if it failed tomorrow. Listen before proposing anything. *Organizational Soul Work* gives the posture in a phrase: "listen first, deeply and patiently, before you do anything at all." The answers will show you where your web is real and where it is only a list of contracts.

For readers placing these practices in the whole of a firm's activity, the Alpha Paper on the value chain reads where value is created, inside the firm and across its boundaries: *Alpha Value Chain*. The history of gainsharing, gainsharing, takes up the question this case leaves open: how the gains from shared effort are returned to those who made them, so that the next time they are asked, they answer.

The same web, at a kitchen table

The case is industrial, and its shape is domestic. Every household runs on a few single sources: one earner's income, one car, one person who knows how the boiler works or where the papers are kept, one grandparent who collects the children on Wednesdays. Most families never draw these out, for the same reason most firms never draw their rim. On an ordinary day the spokes are enough.

The bad week arrives the way the fire did, on a Saturday, without notice. An illness, a lost job, a car that will not start. What decides how the week goes is rarely the family's savings alone. It is whether the people it depends on know each other: whether the neighbour knows the grandparent, whether the friend who could drive knows where the school is, whether anyone besides one tired adult knows what needs doing. A family whose helpers have never met is a set of spokes. A family whose helpers know each other has a rim, and it will recover in days rather than weeks.

The practice is the same at both scales. Introduce the people you rely on to each other before you need them. Settle kindly and promptly with anyone who carries you through a bad week. Let what you know circulate. The tool below works for a supply base and for a street.

The fire, again

Go back to Kariya on that Saturday. The plant is burning. In the account of the fire, a small supplier with three hundred and twenty people on its payroll is about to become one of the first to put a working P-valve on a bench. Nobody has signed anything. A drawing has crossed from one firm to another because both believed it belonged, in a sense that no contract defined, to all of them.

A spreadsheet of that supply chain, drawn the day before, would have shown one supplier for one part, and two or three days of stock. Every line on it would have been accurate. It would have missed the only thing that mattered: the lines it did not draw, between the suppliers themselves. The inventory that saved Toyota was not on any shelf. It was in the web.

The Tool: The Rim Map

A tool for any leader who depends on other organisations, from a manager with five key vendors to a director responsible for a whole supply base. In its household form, it maps the people a family could call on in a bad week. Allow two hours the first time; repeat once a year.

1. Draw the hub and spokes. In the centre of a large page, write your organisation, team or household. Around it, place the eight to twenty organisations or people you depend on most. Draw a line from the centre to each. These are your spokes.
2. Mark the single points. Put a small square beside every spoke that is your only source for something you cannot do without for a week: a part, a service, a skill, a system, a person. These are the places where a fire would stop you.
3. Draw the rim. For every pair of spokes that know each other well enough to call each other without going through you, draw a line between them. Be strict. A line means they could share a problem, a drawing or a person tomorrow, not that they appear in the same directory. For a household: which of the people you rely on know each other?

4. Ask the bad-day question. For each spoke with a square, ask the people in it, and at least one other spoke that could help: *if this failed tomorrow, what would you do in the first forty-eight hours, and who would you call?* Write down their answers in their words. Note whether anyone names another spoke on your map.
5. Find the unwoven squares. Circle every square whose spoke has no rim lines at all. These are the places where, if the source fails, nobody else in your web knows enough to help. They are your real exposure, whatever your contracts say.
6. Weave one line. For one circled square, make a single introduction this quarter between that supplier and one other organisation that could help in a crisis. Make it useful to both: a shared problem, a visit, an exchange of know-how. Then, the next time any partner goes beyond the contract for you, settle with them promptly and fairly, and note on the map that you did.

Reading the map. A healthy map has rim lines around every square and bad-day answers that name other spokes. A map that is all spokes, however many there are, belongs to an organisation that will face its first fire alone. Redraw it each year and count two things: squares without rim lines, and bad-day answers that name someone else on the page. The first should fall. The second should rise.

Your page — run the The Rim Map here, dated.

A note on method

All facts in this chapter about the Aisin fire, the parts, the firms and people who responded, the ownership and sales figures, the length of the shutdown and the industry estimate are taken from Nishiguchi and Beaudet (1998), as stated in that article; this chapter computes no figure of its own and has not checked their underlying sources. Dyer and Nobeoka (2000) is cited at the level of its published abstract.

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The Fire at Kariya

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