

THE EMBEDDED MARKET · CHAPTER SIX

The Cord at Fremont

Chapter Six of The Embedded Market

Ammanuel Santa Anna

Santa Anna, A. (2026). The Cord at Fremont. In The Embedded Market (ch. 6). Luminous Prosperity Inc. https://doi.org/10.5281/zenodo.23989488
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Published by Luminous Prosperity Inc. for Haute Lumière. Author ORCID 0009-0008-3244-0306.

DOI 10.5281/zenodo.23989488 · this record's page: business.hautelumiere.life/library/the-embedded-market/06-the-cord-at-fremont/

Please cite as: Santa Anna, A. (2026). The Cord at Fremont. In The Embedded Market (ch. 6). Luminous Prosperity Inc. https://doi.org/10.5281/zenodo.23989488

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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 an assembly line run the Toyota way, a cord hangs within reach of every worker. It is called the andon cord. A worker who sees a problem pulls it, and help comes to that station while the line keeps moving. If the problem cannot be solved in the time the line allows, the worker pulls it again, and the whole line stops. Read as an object, the cord is a length of rope and a switch. Read as an institution, it is the most concentrated voice channel in modern industry. It gives the person standing closest to a fault the power to halt production for everyone, on their own judgement, at once. The economists Susan Helper and Rebecca Henderson, whose study of General Motors anchors the case in Chapter 5, report an estimate that shutting down the line for a popular model could cost ten thousand dollars in lost profit per minute. A firm that hangs that cord above every station is saying something about whom it trusts to speak.

CHAPTER SIX

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A cord above every station

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This chapter tells the story of one plant where that cord was hung over people who had been, by every account, at war with their managers, and of the company that owned the building and could not carry what it learned there back home. It is the clearest public case of the argument this book has been making: that voice is not a technique, a tool or a piece of equipment, and that a firm which tries to copy it as one will photograph everything except the thing that matters.

The plant before

The plant stood in Fremont, California, and General Motors had run it until it closed the plant two years before the joint venture began. As Helper and Henderson report, drawing on the industrial-relations scholars Clair Brown and Michael Reich, it had been one of the least productive plants in the company and was famous for troubled labour relations. Unexcused absenteeism often exceeded twenty per cent. The plant had accumulated a backlog of more than a thousand grievances. A senior union member described the relationship between union and management as an "ongoing war."[25]

Helper and Henderson describe the wider GM practice of the period in plain terms. Jobs on the line were narrowly defined: a worker would perform the same small set of tasks every sixty seconds for eight to ten hours a day, and was not expected or encouraged to do anything else. Responsibility for improving the process sat with supervisors and engineers. Quality was the job of a separate department that inspected cars as they came off the line. GM's managers, they write, were notorious for believing that blue-collar workers had little to contribute to improving production.[25]

They quote a worker named Joel Smith, interviewed by the management scholar Paul Adler, describing what that meant on the floor. Workers protected their jobs by working slowly, by refusing to show a neighbour how their own job was done, and now and then by throwing a wrench into the equipment so that it

broke down and the repair crew had to come. Management, in his account, answered in kind, with threats and contempt: if you did not do it their way, there were ten more people at the door looking for your job.[25]

Read with Hirschman's three words, the old Fremont is a textbook case of a system in which voice had died and exit had been blocked. Workers could not leave without losing a well-paid job in a union plant. They could not speak to any effect, because nothing they said changed the work. What remained was the fourth response that later researchers added to Hirschman's three and that Chapter 3 described: neglect, the slow withdrawal of effort by people who have stayed but stopped trying. Sabotage is neglect with its sleeves rolled up. The grievance backlog is the sound voice makes when it is being filed rather than heard: a thousand complaints, each recorded, none of them changing anything.

Ammanuel Santa Anna's *Organizational Soul Work* has a sentence for what Fremont had become. "The truth you cannot speak becomes the architecture you inhabit." The worker who knew a better way to do the job and kept it to himself was not being lazy. He was living inside a structure where the truth was dangerous, and the structure was built, piece by piece, out of every truth that had gone unspoken.

The joint venture

In 1984 General Motors and Toyota opened a joint venture in the closed Fremont plant. It was called New United Motor Manufacturing, Inc., NUMMI, and Helper and Henderson are precise about why GM entered it: to gain insight into Toyota's capabilities.[25]

What happened to the workforce is the part of the story that most surprises people meeting it for the first time. Toyota agreed to rehire the entire union hierarchy. When production began, Helper and Henderson report, ninety-nine per cent of the assembly workers and seventy-five per cent of the skilled-trades workers were former GM Fremont employees and members of the United Auto Workers. NUMMI went on to reach levels of productivity and quality comparable to Toyota's plants in Japan.[25]

Same building. Largely the same people. Same union. A different result. The case is so clean that it closes off several of the usual explanations at once, and Helper and Henderson make the point directly: the successes at NUMMI, and at GM's own Saturn project, make it implausible that GM's troubles came from unique features of Japanese culture or from a uniquely recalcitrant workforce.[25] Whatever had changed at Fremont, it was not the workers.

What changed: the work was given back a voice

Helper and Henderson describe the Toyota practice in some detail, and its first feature is easy to misread. Toyota's jobs were, if anything, more tightly specified than GM's. Standard work instructions said which hand should pick up each bolt. This was not a looser system. It was a system in which the specification was precise and the worker was also responsible for improving it.[25]

Each worker was cross-trained to handle six to eight different jobs on the line. Workers were responsible for the quality of the car and for the continual improvement of the process. They took part in teams that looked for ways to make the line faster or more efficient, and they were trained in statistical process control and in experimental design. And each was expected to see quality problems as they occurred and pull the cord.[25]

Put in this book's language, three things had been done at once.

The membrane was opened at the point of greatest knowledge. The person nearest the fault was given a channel that ran straight to the people who could fix it. Under the old system, information about a defect travelled down the line, through inspection, into a report, and back to engineering, if it travelled at all. At NUMMI it travelled the length of a cord.

The price of voice was lowered deliberately. A worker who pulled the cord was met by a team leader who came to help, not by a supervisor who came to find fault. Helper and Henderson, drawing on Robert Gibbons and Henderson's earlier work, set out what that bargain required on both sides in a table worth describing. The worker's part was to pull the cord when there was a real problem and to offer suggestions for improvement, even suggestions that might make a job redundant. The supervisor's part was to treat a pulled cord as a problem to solve, to implement improvements without automatically cutting jobs, and to accept the authority of work teams over some shop-floor decisions. The ways each side could break the bargain are listed beside it: the worker who never pulls the cord out of fear, the supervisor who punishes a worker for pulling it, the supervisor who cuts the workforce as soon as an improvement reveals a spare person.[25]

Voice was made useful as well as safe. The training in statistical process control matters here. A worker who can see a problem but cannot describe it in terms an engineer will act on has a voice that is safe and still weak. Helper and Henderson cite John Paul MacDuffie's account of shop-floor problem solving, which found that good process improvement depended on including several perspectives on a problem, on problem categories loose enough to admit what nobody had foreseen, and on a common language for discussing problems.[25] A common language is voice infrastructure. It is what lets the edge talk to the centre in words the centre can use.

Ecstatic Economics describes the organisational version of this in a sentence that could serve as a caption for the cord: "Vitality-centered organizations cultivate feedback richness — multiple channels, rapid loops, and the psychological safety to deliver and receive honest information without punishment." The cord is a rapid loop. The team leader who comes running is the psychological safety. The training is what makes the information honest and usable at once.



Why it could not be written down

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Why it could not be written down

The deepest point in Helper and Henderson's analysis is about why this worked, and it is the point that explains everything that happened afterwards.

The andon system could not be governed by a written contract. It was, they write, very difficult to specify in advance exactly when a worker should pull the cord, or what counted as being an effective team member. Management had to be confident that a worker deciding to stop a line worth thousands of dollars a

minute had both the knowledge and the incentive to judge well. Workers, in turn, would only pull the cord if they were confident that the right understanding was in place behind it.[25]

Economists call an agreement of this kind a relational contract. Helper and Henderson define it as an agreement based on subjective measures of performance that could neither be fully specified beforehand nor verified after the fact, and that was therefore enforced by "the shadow of the future."[25] Each side kept its part because both expected to go on dealing with each other, and both knew what would be lost if the understanding broke.

That is the precise sense in which voice is embedded. A grievance procedure can be written down. A suggestion box can be bought. The belief, held by a worker on a Tuesday afternoon, that pulling the cord on this particular doubtful seal will be welcomed and not held against them cannot be written down or bought. It exists only in the relationship, and it is built only by what happened the last few times someone pulled.

The photograph

What happened next is the part of the story a leader most needs, because it is the mistake leaders most often make.

NUMMI was, from 1984, GM's privileged window into Toyota's methods. Helper and Henderson report that it took General Motors more than two decades to imitate those methods consistently.[25] They report, too, a story told by Jeffrey Liker, a professor who had consulted to GM since the 1980s, in a 2010 radio documentary. A GM manager was ordered, from the level of a vice president, to make a GM plant look like NUMMI. He was told to go there with cameras, photograph every square inch, and make his own plant look like the pictures. The manager, Liker recounts, knew at once that this was impossible: you cannot copy employee motivation, or good relationships between union and management, and you cannot even take a photograph of them.[25]

The photograph is the image this chapter keeps. It captures exactly what a disembedded view of an organisation can see and what it cannot. A camera can record the cord, the layout of the stations, the boards on the walls. It cannot record the belief that makes a worker pull the cord. GM's managers, Helper and Henderson write, appear for a long time to have believed that the essence of Toyota's advantage lay in tools, such as fixtures for changing dies quickly or just-in-time inventory, rather than in the management practices that made it possible to develop and use those tools.[25]

At GM's Van Nuys plant, managers introduced elements of the practices that had worked at NUMMI. They produced significantly less improvement, and Van Nuys was soon closed.[25] The cord, it turns out, can be installed in an afternoon. What sits behind it takes years, and can be undone in a week.

Credibility: why the past speaks louder than the plan

Helper and Henderson give three reasons why GM found these relationships so hard to build, drawing on the economics of relational contracts. Two of them are the finest points of implementation in this book.

The first is credibility. GM's stance towards its blue-collar workforce, they write, had been deeply adversarial, and it was hard both for GM to change its past patterns of behaviour and for its workers to believe they were changing. They give a sharp example. In 1984 the company announced that it wanted to modify its union contract to support teams and joint problem solving, and then a leaked internal memo suggested that it planned to use the new contract to reduce headcount. Through the 1980s, many in the union leadership remained convinced that GM was adopting these methods only to speed up the line and put workers under more pressure.[25]

Read with Hirschman, this is voice being invited and distrusted in the same breath. An invitation to speak is only as good as the inviter's record. A workforce that has seen a suggestion turned into a redundancy will treat the next invitation as a trap, and it will be rational to do so. Chapter 3 of this book argued that the price of voice is set not by a leader's intentions but by the last few occasions on which someone spoke. Fremont at GM had a thousand such occasions on file.

The second reason is clarity. A Toyota-style relational contract required an immense amount of ambiguous information to be shared before it could work. Everyone involved had to learn which actions counted as cooperation, come to believe those actions were in their own interest, and understand the other side's temptations to defect.[25] That is not something a memo can convey. It is learned the way a language is learned, by use, in the company of people who already speak it. NUMMI had Toyota managers on the floor who spoke it. Most GM plants did not.

Helper and Henderson add a point about structure. GM's focus on short-term financial results, its many levels of control and its large size made credibility harder still. Senior management could announce a commitment to long-term relationships, but until that was matched by commitments and changed incentives at the local level, neither workers nor suppliers appear to have believed that the managers they actually dealt with would keep to it.[25] They report that a GM manager named Weller, sent to spread what had been learned at NUMMI, found some plant managers responsive and others not, including one who asked him to leave the factory after his presentation. Asked why the chief executive would not remove a manager who resisted a better system, Weller said that it was a big company and did not work that way.[25]

That sentence is worth holding beside the cord. At Toyota, a worker could stop the whole line. At GM, a chief executive apparently could not stop one plant manager. Voice had been given to the edge in one system and withheld from the centre in the other.



What the case does not show

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What the case does not show

The NUMMI story is often told as a parable, and parables flatten. Four limits keep it honest.

First, the figures in this chapter are reported by Helper and Henderson from other researchers' work: the absenteeism and grievance figures from Brown and Reich, the rehiring percentages from Adler and colleagues and from Brown and Reich, the productivity comparison from the MIT study *The Machine That Changed the World*. This chapter has not checked those underlying studies independently, and it computes no figure of its own.

Second, Helper and Henderson do not claim that NUMMI's methods alone explain the difference between Toyota and GM, or that the andon cord was the decisive practice. Their argument is about relational contracts as a whole, inside the firm and with its suppliers, and they are careful to present several possible explanations for why GM struggled to build them.

Third, NUMMI was not a utopia. Many in the union leadership, as Helper and Henderson note, suspected that lean methods were a way to intensify work, and that suspicion was not confined to GM's own plants. A system that asks people to improve their own jobs out of existence makes a serious demand. It is only fair if the people who make the improvement share in what it produces and are not the first casualties of it. The supervisor's commitment in Gibbons and Henderson's table, to implement improvements without automatically cutting jobs, is not a courtesy. It is what holds the whole bargain up.

Fourth, the radio documentary quoted for Liker's and Weller's stories is journalism, reported by economists. It illustrates their argument. It does not, by itself, prove it.

What the case does show is a pattern that every other case in this book repeats. The same people, offered a voice that was safe, useful and credible, used it, and the work changed. The organisation that owned the evidence could not carry it home, because it tried to move the visible part and leave the relationship behind.

The finer points, for a leader

Most leaders will never hang a cord above an assembly line. Every leader has a version of it: the moment when someone close to the work can stop something, or chooses not to. Six points of practice follow from Fremont.

Give the stop to the person nearest the fault. Ask where in your organisation a problem is first visible, and whether the person who sees it can stop the process, or only report it. A report travels slowly and loses detail. A stop is voice with authority. It need not be literal: the right to delay a release, hold an order, pause a campaign or refuse a patient discharge until a question is answered is a cord.

Meet every pull with help, not an inquiry. The first response to a stop sets the price of the next one. At NUMMI the team leader came to help solve the problem. In your organisation, the person who raises a flag should hear *thank you, what do you need* before anyone asks whether it was justified. Review false alarms later and privately. A system that punishes false alarms gets silence, and Gibbons and Henderson's table names that defection plainly: the worker who never pulls the cord out of fear.

Never let an improvement cost the improver. If the reward for finding a better way to do a job is losing the job, people will keep better ways to themselves, and Joel Smith's colleagues did exactly that. Decide in advance, and say in writing, what happens to time and people freed by an improvement. Redeploy before you reduce. Where you cannot promise that, say so honestly, and expect less.

Build the common language. Teach people to describe a problem in terms the people who can fix it will use. A short shared vocabulary for problems, a single page for describing one, a habit of naming the evidence, makes voice useful as well as safe. This is training, and it is cheap compared with what it carries.

Match the announcement with the local incentive. A commitment from the top that is contradicted by how a local manager is measured will be believed by nobody. Before announcing that you want people to speak up, find out what happens to a manager whose team raises the most problems. If it counts against them, change that first.

Do not photograph. When you visit an organisation that does this well, resist the temptation to copy its forms, its boards, its meeting rhythms. Ask instead what its people believe will happen when they speak, and how that belief was built. Then ask the same question of your own people, and listen to the answer before you install anything.

Ecstatic Economics has a line on why trust behaves this way inside a firm. Applying the logic of the gift economy to organisational life, it puts the principle in eight words: "trust circulates, and where trust circulates, value flows." The cord carried a signal. The trust behind it carried the value.

A note on governance

The same pattern appears in boardrooms, where the cord is the right of any member to stop a decision and say that something is wrong. Santa Anna's *Conscious Governance Models* is direct about why that right matters: "This capacity for principled dissent is absolutely essential in governance, where groupthink is perhaps the single most dangerous dynamic." A board on which no director has pulled the cord in a year is not necessarily a board in agreement. It may be a board in which pulling it has become too expensive.

For readers who want to place these practices within the whole of an organisation's design, the Alpha Paper on the Viable System Model reads a firm as a nesting of units, each of which must be able to sense and correct itself: *Alpha Viable System Model*. The series on employee ownership, employee ownership, takes the bargain at the heart of the cord one step further, into who owns the gains when the people at the line make the work better. And Santa Anna's own *Ecstatic Economics*, from which this book draws its living-systems reading, is at *Ecstatic Economics*.

The cord, again

Go back to Fremont. The building is the same one that had a thousand grievances on file. The people at the stations are, almost all of them, the people who used to slow the line down and keep their knowledge to themselves. A worker sees a seal that is seated badly. She reaches up and pulls.

Nothing about that gesture could be photographed in a way that would let another plant copy it. What made it possible was a set of promises nobody had written down, kept often enough that she believed them. The cord was a rope. The voice was the relationship it hung from.

The Tool: The Stop-Right Inventory

A tool for any leader of a team, department or organisation, and in a smaller form for a household. It finds where your people can stop a process when they see a fault, and what happens to them when they do. Allow two hours for the first inventory and thirty minutes each quarter after.

1. List the processes that can hurt someone. Write down the eight to fifteen processes in your work whose failure would cause real harm: to a customer, a patient, a colleague, your finances, or your reputation. A release, a shipment, a payment run, a procedure, a hire, a contract. For a household: the car, the money, the children's schooling, a parent's care.
2. Find the first eyes. For each process, write the role of the person who would usually see a fault first. Not the person responsible for the process: the person physically or practically closest to where it goes wrong.
3. Name their right. For each process, write what that person can actually do when they see a fault, in one of four words. *Stop*: they can halt or hold it on their own judgement. *Escalate*: they can raise it with someone who can stop it, quickly. *Report*: they can record it for later. *Nothing*: there is no expected route. Be honest. Write what happens in practice, not what the policy says.
4. Recall the last three pulls. For each process where the right is *stop* or *escalate*, write down the last three times someone used it, as far as you know. Next to each, write what happened to them: thanked, helped, questioned, criticised, ignored. If nobody has used it in a year, write *no pulls*, and treat that as a finding, not as good news.
5. Score the bargain. For each process, answer three questions yes or no. Did the last person who stopped or raised it receive help before they were questioned? Has any improvement in this process ever cost the person who suggested it their role or standing? Is the local manager of this process measured in a way that counts problems raised against them? A process with *yes, no, no* has a working cord. Any other pattern shows where the bargain is broken.
6. Hang one cord. Choose the single process where harm is greatest and the right is weakest. Give the first eyes one step more authority, from *report* to *escalate*, or from *escalate* to *stop*, and say in writing what will happen when they use it: who comes, how quickly, and that they will not be blamed for a stop made in good faith. Then keep that promise the first time it is tested, and tell the team that you did.

Reading the inventory. Over a year, the number of pulls should rise and then settle, and the harm the processes cause should fall. A process where pulls stay at zero is not necessarily safe; it may be silent. A process where pulls rise and the people who pull them are thanked is a process with a voice. Repeat the inventory

each quarter, and compare step four. The measure of progress is not how few faults you have. It is how early you hear about them, and from whom.

Your page — run the The Stop-Right Inventory here, dated.

A note on method

All figures and quotations in this chapter concerning General Motors, NUMMI and Fremont are taken from Helper and Henderson's paper, which reports them from the sources named in the text; this chapter has not checked those underlying sources independently and computes no figure of its own. The page references are to the NBER working-paper version of the paper; the published version appeared in the *Journal of Economic Perspectives*.

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