The Dynamics of Standing Still: Firestone Tire & Rubber and the Radial Revolution

Business historians have illuminated how first movers in many emerging industries secure an enduring leadership position, but have devoted less attention to the processes by which industry leaders relinquish their dominance. This paper examines why rubber industry leader Firestone Tire & Rubber failed to respond effectively to new technology and foreign competition. The author argues that Firestone did not respond by doing nothing, but rather accelerated activities that had contributed to its past success. Firestone’s response was constrained by managers’ existing strategic frames and values, and the company’s processes and longstanding relationships with customers and employees.

Alfred Chandler’s research provides a compelling theoretical model and extensive empirical support for the rise of large industrial enterprises in American business. Corporations which invested early in mass production and marketing, according to Chandler, achieved economies of scale and scope that secured their early lead against subsequent challengers. Chandler has noted, however, that occasionally these first movers relinquish their initial lead, often under pressure from technological discontinuities or aggressive foreign com-

DONALD N. SULL is an assistant professor of strategy and international management at the London Business School.

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petition. The dynamics by which market leaders lose their position is less well understood than the process of establishing a first-mover's advantage, and offers a productive domain for historical research.

The U.S. tire industry provides a striking example of market dominance lost in the face of aggressive foreign competition and technological change. The five largest firms established their market leadership by the early 1930s, and continued to dominate the domestic market nearly half a century later. After French tire manufacturer Michelin introduced the radial tire into the U.S. market in the late 1960s, however, most of the U.S. tire makers suffered costly setbacks while trying to close the technology gap with Michelin and lost significant market share. Each of the five largest companies was the target of at least one hostile take-over bid, and by 1988 only Goodyear remained an independent tire company. In the span of three years, Firestone, Uniroyal, B.F. Goodrich and General Tire—each a household name for half a century—had all been acquired by foreign firms.

Although the tire industry leaders fumbled the transition to the radial tire, it was not because they failed to see the new technology coming. Domestic rival B.F. Goodrich had introduced radial tires into the U.S. market before Michelin, and demonstrated their superior performance in terms of longer wear, lower cost, and enhanced safety. European consumers and automobile manufacturers had rapidly adopted radials in each of the countries where Michelin had introduced them in the decade prior to its U.S. market entry. The major American tire producers all had subsidiaries in Europe, and had witnessed first-hand consumers' rapid switch to the new technology. In the early 1970s, Michelin completed a large radial tire factory in Canada and Japan's Bridgestone began exporting radial tires to the United States. With credible foreign suppliers in place, Detroit's

7David Harkrader, "Pneumatiqques Michelin II" INSEAD Case Study (1978).
automobile manufacturers—which together purchased 30 percent of all tires—demanded in 1972 that their American suppliers provide radial tires or lose market share to foreign competitors. Thus, by 1973 the rapid adoption of radials was both inevitable and predictable, and tire makers in fact accurately forecasted rapid inroads by the new technology.

In the decades prior to the advent of radial tires, Firestone Tire and Rubber was viewed by some observers as the best managed U.S. tire company. Despite its historical leadership, however, Firestone made the same mistakes as its tire industry peers in responding to Michelin’s invasion, and generally exaggerated these gestures with disastrous results. Firestone’s crash investment in radials contributed to quality problems with the Firestone 500 radial tire, which resulted in one of the largest product recalls in history, and delays in closing bias tire plants brought the company closer to bankruptcy than any of its beleaguered competitors. While Goodyear survived as one of the global tire leaders in the radial era, Firestone relinquished its independence to Japanese competitor Bridgestone. Firestone’s historical excellence and disastrous response to global competition and technological innovation posed a paradox for industry observers: Why had the industry’s best managed company turned in the worst performance in a weak field?

Closer analysis reveals that Firestone failed not despite, but because of its historical success. In the years immediately following World War II, Firestone had honed a competitive formula that focused attention on its domestic rivals and large customers, refined processes to design and make tires, forged a dense set of relationships with customers and employees that secured their continued loyalty, and reinforced a strong set of corporate values. While this competitive formula enabled Firestone to succeed in the booming tire market of the 1960s, it constrained the company’s ability to respond to the changes brought about by the advent of the radial tire.

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11For a fuller discussion of why successful companies fail to adapt to changes in their competitive environment, see Donald N. Sull, “Why Good Companies Go Bad,” Harvard Business Review (July-Aug. 1990).
The Days of Wine and Roses

The 1960s were a go-go decade for the U.S. tire industry, and Firestone got more than its fair share of the action. Unit demand for tires increased an average 5.5 percent between 1960 and 1969, and Firestone's growth outpaced the industry as a whole and the company doubled its revenues over the course of the decade. Firestone met this growing demand by investing heavily in new production capacity, building five new factories between 1960 and 1969, which constituted one-quarter of all new tire plants built in the U.S. during this period. The company also invested upstream by building four components facilities producing tire textiles and synthetic rubber, and downstream by acquiring or erecting over 500 company-owned retail tire outlets. Tire stocks were Wall Street darlings, and Firestone's 62 percent increase in stock price easily outpaced the S&P index. At the end of 1969, Chairman Raymond C. Firestone reflected on the preceding decade with pride and looked forward with optimism, observing 'we are confident that the progress made in all areas of our operations during the past year and the past decade has given us a solid foundation for future growth. As we enter the new decade we believe our Company is on the threshold of one of the greatest growth periods in our history.'

Firestone's success was no accident. The company exemplified several of the management nostrums accepted as best practice in the 1960s and later codified into principles by Peters and Waterman in their best-selling book In Search of Excellence. Throughout the 1950s and 1960s, Firestone "stuck to the knitting" and maintained a clear strategic focus on its core tire market, which accounted for more than 80 percent of revenues between 1945 and 1972. While many large corporations pursued diversification during the take-over wave of the 1960s, Firestone remained unfashionably focussed in the tire industry and...
extended its scope only into closely related businesses such as steel wheels for trucks.\textsuperscript{16}

Firestone top managers closely tracked and frequently discussed the strategic initiatives and tactical moves of their four leading rivals—i.e., Goodyear, Uniroyal, B.F. Goodrich and General Tire (see Table 1 for comparative financial performance of the five largest U.S. tire manufacturers). Their discussions were informed by detailed management information systems that reported on rivals’ technical innovations and patents, new product introductions, marketing initiatives and pricing.\textsuperscript{20} The company’s Economic Department benchmarked Firestone’s financial performance and share of key customer’s purchases against the other four industry majors, thereby stoking rivalry for higher market share and profits relative to its peers.\textsuperscript{21} Thus, Firestone’s strategic worldview was reinforced by management information systems that provided a laser-like focus on the core tire business and the company’s traditional rivals.

Firestone’s focus on its four major competitors was intensified by long-standing rivalry and geographic proximity. Although hundreds of entrepreneurs entered the tire industry at the turn of the century, “murderous” price wars and “insane” competition triggered a shakeout in the tire sector which consolidated the leadership of first-movers U.S.

\begin{table}
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\begin{tabular}{|l|c|c|c|c|c|}
\hline
\textbf{ } & \textbf{Total Corporation} & \textbf{ } & \textbf{Domestic Tire} & \textbf{ } & \\
\textbf{} & \textbf{Sales} ($ million) & \textbf{Pre-Tax Return on} & \textbf{Sales} ($ million) & \textbf{Tire Sales as} & \textbf{Pre-Tax Return on} \\
\textbf{ } & \textbf{Sales} & \textbf{Sales} (\%) & \textbf{Percent of} & \textbf{Sales} (\%) & \\
\hline
Goodyear & 4,008 & 7.7 & 2,146 & 53.6 & 8.0 \\
Firestone & 2,770 & 8.6 & 1,395 & 50.4 & 7.1 \\
Uniroyal & 1,829 & 3.8 & 736 & 40.2 & 0.0 \\
B.F. Goodrich & 1,468 & 4.7 & 553 & 37.7 & 2.1 \\
General & 1,240 & 7.7 & 472 & 39.0 & 8.2 \\
\hline
\end{tabular}
\caption{Comparative Financial Performance of Major U.S. Tire Manufacturers: Average 1968-1974}
\end{table}

\textsuperscript{16}D. J. Ravencraft and F. M. Scherer, \textit{Mergers, Schiffs and Economic Efficiency} (Washington, D.C., 1987); Firestone Tire & Rubber Company, \textit{Internal Financial Reports} (various years). All Firestone internal documents cited in this article are located in the Firestone Archives, Akron, Ohio.

\textsuperscript{20}Minutes of the Executive Committee Meeting (various years).

\textsuperscript{21}Firestone Tire & Rubber Company Economic Department, \textit{Rubber Industry Handbook} (various years).
Rubber (renamed Uniroyal in 1964), Goodyear, B.F. Goodrich and Firestone, each of which was among America's hundred largest industrial enterprises by 1917. When General Tire emerged as a strong fifth competitor by the end of the Second World War, a competitive structure emerged which endured for decades to follow. Four of the five companies that emerged as tire industry leaders had their headquarters in Akron, and by 1926 approximately 60 percent of all American tire production took place within the city limits, earning Akron the nickname "Rubber City." A host of institutions sprouted to support the burgeoning tire industry, including Buchtel College which offered the first course in rubber chemistry in 1909, the United Rubber Workers established in 1935, and the Akron Beacon Journal. The Akron Beacon was the flagship paper of the Knight family's newspaper empire, and provided in-depth coverage of the tire industry beginning in 1903 when Charles Knight acquired the paper. Perhaps the most influential institution in Akron had nothing to do with tires and rubber directly. The Portage Country Club provided the social setting where successive generations of executives from Goodyear, Firestone, B.F. Goodrich and General Tire would congregate to "talk tires" over a snifter of brandy and a good cigar.

Peters and Waterman characterize the best companies as not only focussed on their competitors, but also having a "bias for action" which they define as "a preference for doing something—anything—rather than sending a question through cycles and cycles of analyses and committee reports." Firestone's processes for designing new products, manufacturing tires and allocating capital all enabled rapid action. Throughout the 1950s and 1960s, Firestone produced a steady stream of new products, increasing the total number of individual tire types sold from 4,000 to 6,700 between 1968 and 1972.


Love and Giffels, Wheels of Fortune, 300-303; United Rubber Workers, A Brief History of the United Rubber Workers, Akron, Ohio: United Rubber Workers internal document.

Love and Giffels, Wheels of Fortune, 314.

Peters and Waterman, In Search of Excellence, front page.
alone. Firestone's thousand person Research and Development Department had honed a process for modifying the basic bias tire design through cosmetic changes, such as raised white letters and alternative tread shapes and sizes, that differentiated the product without disrupting well-established manufacturing routines. Thus, when Goodyear introduced its first belted bias tire in November 1967, Firestone was able to quickly follow suit and bring its own version of the belted tire to market within a few months.

Firestone's capital investment process also allowed the company to rapidly translate customer demand into capacity additions. Like other successful companies during the 1960s, Firestone had in place a bottom-up capital budgeting process that excelled in adding new production capacity in response to growing demand. In this process, front-line marketing and sales employees identified opportunities to sell more tires to the automobile manufacturers or dealers, and worked with manufacturing managers to translate these opportunities into concrete proposals for investment in new capacity. Middle managers then selected the most promising proposals from the many they saw, and championed the chosen few before Firestone's Executive Committee. This committee met weekly, and rapidly approved nearly all the proposals it considered. In the late 1960s, for example, the Executive Committee rejected or reduced under 10 percent of all proposals it reviewed, approving big ticket expenditures as quickly as smaller

27 Donald N. Sull, "Organizational Adaptation and Inertia in a Declining Market: A Study of the U.S. Tire Industry" (Ph.D. diss., Harvard Business School, 1986), 105. Firestone was not alone in developing this stream of new products and its competitors also barraged customers with a series of new products; see French, The U.S. Tire Industry, 94.


30 The seminal theoretical and empirical research on intra-firm resource allocation processes was conducted by Joseph L. Bower, Managing the Resource Allocation Process (Boston, 1970). The resource allocation process in Firestone is documented in Sull, "Organizational Adaptation and Inertia," 96-106.

31 The Board of Directors generally accepted most recommendations of the Executive Committee without discussion for three reasons. First, the members of the Executive Committee constituted a majority of the Board. Second, Raymond C. Firestone chaired both the Executive Committee and the board of Directors through 1973. Finally, the Board was dominated by insiders, with the first outside board member without close ties to the Firestone family elected in 1972.

32 Report of Appropriations (various years). These documents were kept for every capital investment proposal brought before the Executive Committee, and detailed the department originating the proposal, a description of the proposal, the date of first proposal, the amount requested and the committee's ultimate disposition. Taken together, these reports constitute a paper trail for analyzing capital budgeting by proposal over time within Firestone.
items. In this bottom up process, each level in the hierarchy relied on the level below them to weed out unattractive proposals and add momentum to promising alternatives, and their confidence was premised on the superior information their subordinates possessed as well as their strong incentives to pick winners. Like its new product development, Firestone’s bottom-up capital budgeting process allowed the company to rapidly invest in building new production capacity to seize share in the booming tire market.

Firestone’s relationships with Ford and its loyal dealers exemplified the principle of “staying close to your customer.” Six decades after Firestone tires were placed on the Model T, Firestone remained the dominant supplier to the Ford Motor Company accounting for nearly one-half of Ford tires. The ties that bound the two companies were knotted more tightly when Harvey’s granddaughter married William Clay Ford, Henry’s grandson and the largest shareholder in Ford Motors. Firestone managers carefully monitored and jealously guarded their company’s market share at Ford and the other Detroit automobile manufacturers. Firestone also supported the company’s largest dealers with a number of services, including co-operative advertising, technical assistance and financing to win their loyalty and stimulate their growth, and even provided personal financing to help loyal dealers suffering financial difficulties. Firestone’s close relationships with its end customers and dealers kept management abreast of emerging market trends and gave the company an edge in protecting and expanding its market share.

Firestone managers also placed great emphasis on a set of core values, embodied in the idea of “family loyalty” which top managers repeatedly underscored in their public and private statements. The emphasis on family values may have stemmed, in part, from the enduring role played by the founding Firestone family in the company’s operations. In the late 1960s, the Firestone family owned approxi-
mately 25 percent of the firm, and Raymond C. Firestone, one of the
founder's five sons, served as the Chairman of the board, along with his
brothers Leonard and Harvey, Jr., who also sat on the board. Kimball
C. Firestone took his father's seat when Leonard resigned in 1974
ensuring the Firestone family a continued say in how the firm was run. The company's process for recruiting and promoting professional
managers also reinforced their corporate loyalty, and ensured a steady
stream of executives steeped in the company's values. In the early
1970s all of Firestone's top management team had spent their entire
career with the company, two-thirds were Akron born and bred, and
one-third followed in their fathers' footsteps as Firestone executives. Tire industry insiders referred to these managers as "gum dipped," a
reference to a manufacturing process in which cloth strips were dipped in rubber and took on a uniform shape.

Firestone's family values were manifest concretely in local build-
ings and institutions bearing the Firestone family name, many of which
stemmed from the early days of the industry. Fuelled by explosive
growth in tire production, Akron grew faster than any other U.S. city
between 1910 and 1920, with the population tripling in a decade. The
population explosion severely taxed the city's housing, and in some of
Akron's boom years the number of residents exceeded the total num-
ber of beds, let alone housing units. Harvey Firestone responded to
housing shortages in 1915 by dipping into the corporate coffers to
underwrite the design and construction of Firestone Park, a 1,000
home development providing affordable housing for employees. The
Firestone family and corporation generously funded local charities, and
the Firestone name graced a high school, park, school of nursing,
music conservatory, and an eight lane highway in Akron.

The Firestone Country Club epitomized the company's family val-
ues for many people. In contrast to the exclusive Portage Country
Club, the Firestone Country Club was open to all employees based on
tenure with the company rather than rank in the corporate hierarchy,
and provided a social setting where employees across levels of the com-
pany socialized together. Richard Riley, who joined the company in
1939, and rose to the rank of president in 1971, regularly golfed with

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39Sull et al., "Managerial Commitments," table 1.
40Harry Mills, interview with author, 21 July 1994. Mills was a leading tire industry analyst.
42Love and Giffels, Wheels of Fortune, 47.
43Ibid., chap. 5.
44John Nevin, interview with author, tape recording, Akron, Ohio, 21 Sept., 1994; Lee Bro-
dour interview, Love & Giffels, Wheels of Fortune.
Firestone employees at the Firestone Country Club. These actions by managers inspired reciprocal loyalty from Firestone employees, who felt "a tremendous sense of family loyalty to the company," according to former Firestone President Lee Brodeur, and which led them to "dedicate their lives to the company way beyond the call of duty." 

The corporate values also influenced how executives managed the company on a daily basis. Like other leading companies at the time, Firestone implicitly promised employees a job for life. Top-level executives took a genuine interest in the employees' well-being and devoted considerable discussion to issues such as a physical exercise program for plant workers and a mandatory seat belt policy designated to prevent traffic injuries among workers. To promote corporate citizenship, Firestone executives set an example of civic leadership and strongly encouraged other managers to serve on charitable and civic boards, and also carefully monitored United Way contributions to ensure that Firestone led in contributions in every community where the company operated.

Thus, in the 1950s and 1960s, Firestone owed its success in large part to managers who exemplified best management practices. The company had a clear strategic focus, strong relationships with key customers and employees, product design and capital budgeting processes that facilitated rapid action, all of which were supported by a strongly held set of corporate values. And Firestone's competitive formula served the company well in the decades immediately following the Second World War.

Business As Usual

By the mid-1960's, however, U.S. tire companies began to feel the first tremors of the competitive earthquake that would ultimately reshape the industry. In 1966, Michelin struck a deal with Sears to manufacture radial tires for sale under the "Allstate" label and within four years

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45 Tom Reese (former Firestone Vice President of Sales), interview with author, tape recording, Cleveland, Ohio, 19 July 1994; and Paul Vatter (member of Firestone's Board of Directors during the late 1970s and early 1980s), interview with author, tape recording, Boston, Mass., 32 July 1994.
46 Brodeur interview.
49 Minutes of the Board of Directors' Meetings (13 Dec. 1977). The company would go to great lengths to protect its employees, and paid $3 million to ransom a middle manager kidnapped by Argentinean terrorists in 1973.
Sears was selling one million units per year. In the mid-1960s, B.F. Goodrich embraced radial technology as a means to win market share from its larger rivals, and the company introduced the first American made radial in the mid-1960’s and supported the launch with the “Radial Age” advertising campaign in 1968. The August 1968 Consumers Reports awarded its top two spots to radials and documented the new technology's longer life, increased safety, handling and economy relative to even top of the line bias tires.

While radials produced a boon to consumers, this widespread acceptance would prove a bane for incumbent U.S. tire makers. Radials' longer life would decrease unit demand in the profitable replacement market, provide an opening for foreign producers and smaller players like B.F. Goodrich to seize market share. Shifting to the new technology would also require an enormous investment by incumbent players to upgrade their existing production capacity. Industry leader Goodyear acted quickly to deflate radials' progress, and in 1967 introduced the belted bias tire, an extension of the existing bias technology. Goodyear aggressively promoted the bias belted tire, claimed that it conferred significant performance improvements and launched an advertising campaign questioning the benefits of radials. Firestone, Uniroyal and General Tire quickly followed Goodyear's lead and introduced their own belted bias tires, and the new tire design rapidly gained share in the U.S. market (see Figure 1).

Although radials represented a sharp break with existing tire technology, tire industry managers interpreted the new technology in terms of their pre-existing strategic world-view. Many Firestone managers saw the thrust and parry between Goodrich and Goodyear as the latest battle between two traditional foes in which the smaller player tried to win market share through innovation, while the industry leader continued by marketing an upgraded version of the existing technology. Firestone executives expected the new tire to fuel the next spurt of industry growth, much as earlier product extensions had in previous years.

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51 Blackford and Kerr, B.F. Goodrich, 276.
53 Sull, et al., “Managerial Commitments.”
55 Millis interview; Brodeur interview.
Figure 1
Percentage of Tires Shipped by Construction Type: 1961-1989


Just as Firestone's managers could easily interpret Goodyear's introduction of belted bias technology using their traditional strategic framework, the existing processes enabled the company to respond rapidly to the new product. After Goodyear introduced its first belted-bias tire in 1967, Firestone's Research and Development group responded with a matching product in a matter of months and provided a second generation belted bias tire within a year.\textsuperscript{57} Belted bias tires could be manufactured with minor modifications of existing production equipment, and Firestone increased its capital spending in tires in 1968 and 1969, retooling its factories to accommodate belted bias production.\textsuperscript{58} The records of Firestone's board meetings demonstrate no systematic evaluation of the decision to invest in the belted bias transition, but rather reveal a pattern of incremental investments approved individually. Although Firestone encountered some production glitches in refining the new process, overall the transition from


bias to belted bias tires proceeded smoothly. Former Firestone President Lee Brodeur, recalls that the transition to belted bias entailed "a certain amount of development and improvement, but nothing major. It was pretty much business as usual."

Firestone's investment in radials, it appears, also followed the pattern of business as usual. When the automakers switched to radials in the fall of 1972, Firestone's bottom-up capital budgeting process functioned flawlessly, quickly converting Ford and General Motors' demands into concrete commitments to radial production capacity. In a November 1972 Executive Committee meeting, Manufacturing Vice President Mario DiFederico informed his colleagues that marketing managers had already made commitments to supply Ford and General Motors with 433,000 radial tires per month by the following summer and wanted to promise additional tires if capacity was on stream. DiFederico argued that the quickest way to ramp up the additional capacity would be to convert existing factories, but that this "quick fix" would prove insufficient in the long term and that Firestone would need to build a dedicated radial factory. The Committee, according to the minutes, "instructed Mr. DiFederico to proceed immediately to place orders for the long lead time equipment and bring the formal request to the Committee as soon as possible," thus pre-approving the required capital spending without benefit of formal review or even in-depth discussion.

The Executive Committee reconvened one month later to review the formal request for $90 million to build a new radial factory, and an additional $36 million to convert existing plants to radial production and build radial inventories. Following the informal authorization granted a month earlier, the Committee treated the request's approval as a fait accompli, and the discussion focused on implementation details, such as optimal plant location, rather than the fundamental soundness of investing so heavily in radials. The strategic question as to "whether Management wants to invest the substantial capital to provide the additional capacity that will be required" was buried in a footnote on the ninth page of a forty-nine page presentation. This investment in radial tires for Firestone's North American business was the first of many, and in the subsequent seven years Firestone invested

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60Brodeur interview.
61Minutes of the Executive Committee Meeting (3 Nov. 1972).
62Minutes of the Executive Committee Meeting (6 Dec. 1972).
63DiFederico interview.
an average of $60 million of capital expenditure in excess of depreciation per year.\textsuperscript{64}

In this December meeting, Firestone managers also decided to manufacture radials using modified bias tire equipment.\textsuperscript{65} This decision allowed Firestone to rapidly ramp up its radial production capacity to narrow the gap with Michelin and meet automakers’ requirements. Within two years of its introduction, the company’s flagship Firestone 500 Steel Belt was the most recognized brand in the industry.\textsuperscript{66} While the decision to leverage existing manufacturing processes allowed rapid market penetration, it also contributed to quality problems with the tire’s steel cords which failed to adhere properly to the rest of the tire.\textsuperscript{67} Although other companies also experienced quality problems with their radials, Firestones’ were the most severe, and the company came under heavy pressure from consumer groups and the National Highway Safety Administration. In 1978, the company agreed to a voluntary recall of 8.7 million Firestone 500 tires at a cost of $150 million after taxes—an action that constituted the largest consumer recall in U.S. history.\textsuperscript{68}

Firestone’s move into radials was not only consistent with the company’s standard operating procedures for developing products and allocating capital, but also enhanced its relationships with established customers and employees. Ford and General Motors provided the initial impetus for radials when they demanded the new tires, and Firestone marketing managers responded by giving their core customers exactly what they wanted. It is important to note that no attempt was made to justify the investment for automakers on economic grounds. The projected return on the investment to serve Detroit was 6.5 percent, which fell below the investment hurdle rate of 8 to 10 percent used to evaluate other investments at the time, and was well below the 28 percent average return on investments the company enjoyed outside its North American Tire business.\textsuperscript{69} Even this low return was optimistic, moreover, since Firestone had actually lost money on its sales to automakers (even before deducting any corporate overheads) in three of the preceding four years, for a cumulative loss of $12.7 million.\textsuperscript{70} While the radial investment served the

\textsuperscript{64}Sull, “Organizational Adaptation and Inertia,” 111, table 4.
\textsuperscript{65}Wyckoff, “Firestone,” 3; Davidson, “Managing Product Safety,” 4.
\textsuperscript{66}Love and Giffels, Wheels of Fortune, 150.
\textsuperscript{67}Ibid., 150-151.
\textsuperscript{68}Ibid., 152.
\textsuperscript{69}Sull, “Organizational Adaptation and Inertia,” 111.
\textsuperscript{70}Internal Financial Reports (1968-1972).
interests of long-standing customers, it could hardly be expected to earn an acceptable return.

The investment in radials also supported Firestone's relationships with employees and host communities. In his 1976 annual address to shareholders, Firestone Chairman and CEO Richard Riley justified his company's heavy investment in terms of creating jobs instead of creating value for owners:

The replacement and building of plants is what enables companies to continue to provide jobs ... jobs that will eventually dry up unless companies invest ... and when this happens, it will not be something abstract that we may call "The World of Business" or "The Corporation" that will be harmed. It will be companies, and people, and families.\(^7\)

The desire to protect current employees' interests also helps explain why managers chose to build most of their radial capacity by converting existing factories rather than building greenfield facilities, despite the economic advantages that the latter offered over the former.\(^2\)

No Exit

While investment served the interests of employees in the converted factories, it jeopardized jobs in the bias plants left behind. The arithmetic of radials was simple: The new tires lasted twice as long as existing bias design, and consumers would therefore buy replacement tires with approximately one-half the frequency. Since the existing factories could be converted to produce approximately the same number of radials as bias tires, the tire industry's heavy investment in radial production capacity necessarily resulted in excess capacity to produce bias tires. Symptoms of bias overcapacity appeared soon after Firestone's investment in radials, as capacity utilization dropped below the break even level. Operating profits on bias tires slipped to $1 per unit and internal analysis revealed that certain bias plants were losing up to $10 million per year.\(^3\) Despite the underutilization and resulting losses, Firestone managers closed only a single plant in the seven years following their large plunge into radial tires.

\(^7\)Remarks of CEO to Annual Stockholders' Meeting (1972).
\(^8\)Minutes of the Executive Committee Meeting (6 Dec. 1972).
Although Firestone’s three outside directors constituted a minority on the company’s eleven person board, they repeatedly took management to task for shrinking profits in the core tire business, discussed deterioration in the company’s stock price and credit rating, and urged management to develop a long-term financial plan. Outside board members also requested profit and loss statements for individual bias plants to identify candidates for closure but had not received the requested information after a year and a half, at which point they apparently gave up asking. Willard Butcher, the president of Firestone’s lead banker Chase-Manhattan, repeatedly urged management to close unneeded bias factories, and finally vented his frustration in a 1978 board meeting:

The investment made in North America in the last few years meant that the radial tire had been given to motoring public for nothing, because the old bias tire capacity was still in place and the radial tire capacity had been added at enormous expense to it.

Thus, it was both obvious that bias capacity reductions were necessary and clear that Firestone management was resisting these actions.

Failure to close bias factories can be partially explained by managers’ instinctive strategic framing of tires as a growth industry, which it had in fact been for the preceding decades. In six of his seven annual addresses to Firestone shareholders between 1972 and 1979, Riley stressed growth as the company’s primary objective. Firestone management planned to achieve this growth by adding more radial capacity, entering new segments of the tire business such as radial truck tires, stepping up new tire development and diversifying into closely related fields. Even Riley, however, questioned Firestone’s ability to achieve the growth that he himself forecast. After presenting the company’s five year plan in early 1978, Riley told the Board “I have to confess that all of us, even after reviewing, dissecting and challenging this plan ... feel somewhat uncomfortable when we see the Corporate totals [i.e., aggregate growth projections] I have pre-

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74On deteriorating profits, see Minutes of the Board of Directors’ Meeting (23 Mar. 1976); on stock price and credit rating, see Minutes of the Board of Directors’ Meetings (25 May 1976 and 16 Nov. 1976); and on need for financial plan, see Minutes of the Board of Directors’ Meeting (21 Aug. 1976).
75Minutes of the Board of Directors’ Meetings (20 June 1978 and 14 Nov. 1978); Minutes of the Board of Directors’ Meeting (16 Oct. 1979).
77Minutes of the Board of Directors’ Meeting (21 Mar. 1978).
78Transcript of Chairman’s Remarks to the Annual Shareholders Meeting (1973-1979).
79Minutes of the Board of Directors’ Meeting (21 Feb. 1978).
sented this morning."²² Riley apparently suffered cognitive dissonance when his view of tires as a growth business clashed with the realities of the market in the wake of radial tires.

Firestone's bottom-up capital budgeting process, which promoted investment so smoothly, unfortunately stalled in reverse and therefore hindered the company from closing unnecessary factories. Existing customers had no incentive to advocate capacity reductions that would decrease their bargaining power, nor were middle managers likely to promote plant closures that jeopardized their jobs and communities. John Nevin, the outsider who joined Firestone from Zenith in 1980, later recalled that the managers of the factories would think "oh my god, its my wife and my kids that need the income ... so we never had situations where the Decatur plant volunteered to be shut down because it was good for the company."²³ Instead of proposing plant closure, middle managers presented proposals for capacity additions and upgrades to improve their operations.²⁴

Absent bottom-up pressure, the onus for disinvestment fell squarely on the lap of Firestone's top management. Yet they conspicuously failed to advocate plant closure. Their failure cannot be attributed to ignorance of the problem, since they experienced constant and growing pressure from outside board members to close bias plants. Nor can their reluctance be attributed to insufficient financial incentives for managers to improve profits. Richard Riley owned 70,000 shares of Firestone stock, which constituted the majority of his personal net worth, and personally lost over $1 million through the deterioration in Firestone's stock price during his tenure.²⁵

Reluctance to harm the interests of employees and host communities offers a more persuasive explanation of Firestone managers' delays in plant closure. In his addresses to increasingly restive investors, Riley explicitly referred to employees and communities in addition to owners and customers as part of "the worldwide Firestone family," asserted the commonality of all stakeholders interests, and requested "shareholders' patience while management tried to increase profits without harming

²²Ibid. Other top managers agreed. North American Tire Operations President Frank LePage told the other members of the Executive Committee "that he was not spending enough money to keep the Domestic Tire business healthy, and yet he had difficulty in promising a satisfactory rate of return on the money actually being spent because of the nature of the market." Minutes of the Executive Committee Meeting (16 Mar. 1979).
²³Nevin interview.
²⁴Roy Gilbert (former Vice President who worked closely with Nevin), interview with author, tape recording, Fairlawn, Ohio, 10 Aug. 1994.
²⁵Proxy statements (various years). Riley owned over three times as many shares as his successor John Nevin when the latter led Firestone's restructuring, Employment Agreement between John Nevin and Firestone (1 Dec. 1979).
employees or communities. This concern for employees was illustrated in how Firestone proceeded in closing the one plant it did shutter in 1978. Although the Akron 2 factory had been losing money for years before radial adoption further depressed its profits, management decided to gradually phase out production over several years through a hiring freeze and planned retirements, and prided themselves on closing the plant without any layoffs. The physical building also defied

45Minutes of the Executive Committee Meeting (7 Mar. 1971); Nevin interview.
quick demolition, and the Eslich Wrecking company required two 
years to demolish the building, twice the time normally required to 
destroy a comparable building.65 One former Firestone Vice President 
recalled that "Riley just lingered and lingered trying to hold on to the 
employees, he knew them, their kids, he had golfed with them for years 
and years."66

Although the motives for delaying exit may have been admirable, 
the financial results were disastrous. Operating profits in Firestone's 
North American Tire Operations deteriorated rapidly as bias losses 
first negated and then exceeded profits from radial tires (Figure 2). 
These losses, coupled with the large cost to cover the Firestone 500 
recall and the investment in radial capacity resulted in a cash deficit of 
over $700 million between 1973 and 1979.67 Firestone covered this 
shortfall by doubling long-term debt from a 1972 level of $635 million

65Love and Giffels, Wheels of Fortune, 194-6.
66Beece interview.
67See, "Organizational Adaptation and Inertia," 110-111.
(30 percent of entity value) to $1.294 million in 1979 (70 percent of entity value). Banks refused to lend money to Firestone after credit rating agencies downgraded the companies debt four times between 1977 and 1979, after which time Firestone resorted to off balance sheet financing through its Credit Card subsidiary. In late 1979, a year in which Firestone’s plants had operated at 59 percent of rated capacity and the company’s domestic tire business had consumed over $200 million in cash, Riley told the board that “he saw no plant closures on the immediate horizon.”

By 1979, Firestone’s situation had grown acute. Fortune reported that “in a shrinking U.S. market, Firestone rented warehouses and crammed them with Brodingnanian inventories of unsaleable products.” Over 700 irate investors thronged to the company’s 1979 shareholders’ meeting, where one dissident investor proposed firing top management, liquidating the company and distributing the proceeds to shareholders. When Firestone’s fifty-seven-year-old President retired in July 1979 for “personal reasons,” the three outside members of the board formed a search committee to find his replacement outside the firm. In November of that year, the board elected John J. Nevin—the former CEO of Zenith—as the first outside president in Firestone’s seventy-nine-year history.

New Broom Sweeps Clean

Three months after joining the company, John Nevin announced that he would close five of seventeen North American tire plants, which were then operating at 50 percent of capacity, cut inventories from 16.7 million tires in 1979 to 9.7 million in 1981, and slash the number of different tires produced from 7,300 to 2,600. In addition to restructuring Firestone’s North American Tire operations, Nevin also terminated or sold several overseas tire subsidiaries and non-tire businesses. These actions resulted in a sharp reduction in revenues, and 24,000 workers (22 percent of employees in 1979) leaving the payroll.

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90 Ibid., 111. Entity value is defined as the sum of a corporation’s total market capitalization and long term obligations.
92 Minutes of the Board of Directors’ Meeting (13 Nov. 1979).
95 Minutes of the Board of Directors’ Meeting (13 Nov. 1979).
Although some considered Nevin’s actions “brutal,” one tire industry analyst concluded that “Nevin did exactly what the board had hired him to do ... rescue the company from the brink of financial disaster.”

The operational and financial results of Nevin’s actions were dramatic. After these steps, Firestone’s remaining tire facilities ran at 91 percent of capacity. North American operating profit increased from a $31 million loss in 1979 to a profit of $85 million in 1981, and debt was pared to 29 percent of book equity in 1981 from its peak of 70 percent the previous year. Firestone’s average annual return to shareholders in Nevin’s first two years was 41 percent, easily outperforming both the rest of the tire industry at 32 percent and the S&P index return of 14 percent. A consultant to Firestone observed “that Nevin did more in five weeks than had been done in the previous fifty years.”

What Nevin needed to do was pretty obvious, and one advisor noted that “you could almost outline the restructuring on a piece of paper ... the company had overcapacity and it was pretty simple to figure out which plants were worst.” The specific steps Nevin took in restructuring Firestone, however, provide insights into the sources of inertia. When Nevin arrived at Firestone, he found the incumbent management team “a bunch of clones” who all viewed the world in the same way, an observation that he shared with a reporter from a national business magazine. Nevin quickly proceeded to hire outside managers who brought a fresh perspective on the tire business, and by 1983 only five of twenty-five corporate officers remained from 1979. The influx of outside managers rankled many Firestone veterans, who resented having to “humiliate themselves and take advice from these young Harvard Business School people who think they know everything.” Nevin, in contrast, believed that some of the outsiders were not aggressive enough. He replaced Firestone’s CFO three times in as many years, leading the wife of one Firestone executive to quip “John, I hope you’re not planning to make this an annual event.” Nevin also


Ibid.

Managing Director of Management Consulting Firm, interview with author, tape recording, Boston, Mass., 19 Sept. 1994. This consultant, who consented to an interview under the condition of anonymity, had worked closely with John Nevin.

Ibid.

Nevin interview; Brodeur interview.


Brodeur interview.

Nevin interview.
raised the number of outsiders on Firestone's board from 4 of 10 when he joined, to 7 of 12 two years later.104

To drive necessary plant closure, Nevin initially circumvented Firestone's bottom-up capital budgeting process. Nevin bypassed the traditional channels within Firestone in gathering data, and instead engaged an outside consulting firm to gather market information. He personally met with Firestone's top 100 managers, over 100 sales people, all three automotive companies and over 200 dealers and store managers in his first four months on the job.105 To analyze the data and evaluate alternatives, Nevin relied on a team of six hand picked executives whom he forbade to discuss their work with anyone else in the company.106 Although previous investment and disinvestment proposals had always gone through the Executive Committee before moving to the board, Nevin took his initial restructuring proposal directly to the Board without consulting anyone but Riley, whom he informed of his recommendations the night before the March 1980 board meeting.107 "We were shocked," recalls board member Lee Brodeur. "He made one big move and bang we closed five plants."108 In the months that followed his initial restructuring proposal, Nevin repeatedly bypassed the Executive Committee and brought recommendations to close or sell operations directly to the board.109

After initially circumventing Firestone's bottom-up investment process, Nevin later dismantled it altogether. In his first board meeting as CEO, Nevin stripped the Executive Committee of responsibility for "new plants, major expansions, acquisitions, new business ventures, and major capital expenditures." He also mandated that the six-member committee include three outside directors, although it had historically consisted solely of insiders. Nevin also dissolved the Appropriations Committee of line managers that screened capital requests at the behest of the Executive Committee.110 Six months later Nevin assumed the Chair of the Executive Committee, and decreased its membership to himself, one other inside manager, and three outside board members, thereby seizing what little influence the Executive Committee still had.111

104Proxy statements (1979–1982).
106Nevin interview.
107Ibid.
108Brodeur interview.
110Minutes of the Board of Directors' Meeting (19 Aug. 1980).
Nevin also took steps to dissolve historical relationships with customers and employees. Private brand customers had grown accustomed to Firestone bearing the costs of short production runs, warehousing, and carrying large inventories and were shocked when Nevin stated that Firestone would only sell tires with a 15 percent return on investment, and proceeded to slash the least profitable 60 percent of the private brand business.\textsuperscript{112} While sharply curtailing the private brand business, the new CEO maintained relationships with automakers, primarily to maintain the company’s attractiveness as an acquisition for a foreign tire maker trying to enter the U.S. market.\textsuperscript{113}

Firestone’s relationships with employees were shattered through repeated layoffs and management’s new policy of pitting one plant against another to ensure their survival.\textsuperscript{114} While sympathetic to veteran managers’ concern for their employees, Nevin also realized that this loyalty had driven Firestone to the brink of bankruptcy, and wanted to replace the implicit contract of loyalty in exchange for lifetime employment with a new deal that emphasized pay for performance. “Philosophically,” Nevin later recalled, “I believe very strongly that executives should get rewarded in some direct relationship to shareholder value.”\textsuperscript{115} Nevin fundamentally restructured Firestone’s incentive structure to reflect this change in values. Nevin granted stock options extensively at all levels in the organization, and instituted performance-based bonuses for top executives which could reach 25 to 50 percent of their base pay if the company and their divisions met or exceeded budget.\textsuperscript{116}

Nevin also took a series of actions that had tremendous symbolic impact in signaling the break with Firestone’s traditional values. He kept his distance from the Akron tire elite, maintaining his house in Chicago and renting a small apartment in Akron, well outside the five block radius where most top tire executives lived.\textsuperscript{117} He later moved corporate headquarters to Chicago, in part to distance the company’s top executives from its Akron past.\textsuperscript{118} In what was perhaps the most symbolic break with the past, however, Nevin sold off the Firestone

\textsuperscript{112}Reese interview.
\textsuperscript{113}Nevin interview.
\textsuperscript{114}Ibid. See also “Surviving the Shakedown: Three Firestone Plants Provide Contrasts in Survival,” \emph{Akron Beacon Journal}, 21 Jan. 1980.
\textsuperscript{115}Nevin interview.
\textsuperscript{116}For general discussion of traditional and revised management incentives see Nevin, Brodeur, and Gilbert interviews.
\textsuperscript{117}Nevin interview; Love and Giffels, \emph{The Wheels of Fortune}, 261.
\textsuperscript{118}Nevin interview.

The Really Hard Part

"John J. Nevin has completed the tough, nasty part of the job of turning Firestone Tire & Rubber Co. around." The Wall Street Journal reported in late 1981. "Now comes the really hard part." During his first two years, Nevin had improved Firestone's operations by mainly closing money-losing operations, but by 1982 most of the obvious restructuring was behind him. Firestone needed to improve ongoing performance despite low growth in tire demand, a surge in imports, and large investment demands from OE customers. In this Nevin failed. Firestone's core tire business fell $230 million short of projected operating profits in 1985, and provided a return on assets of minus 2 percent.‡

The company continued to liquidate significant portions of its portfolio, and in June 1981 Nevin presented the board with a strategy to sell all divisions except for domestic passenger tires and the company controlled retail outlets. The biggest shock to many managers came when Nevin decided to dispose of Firestone's Seat Belt, Automotive Foam Rubber and Truck Wheel businesses, although they all enjoyed returns on equity ranging from 15 percent to 50 percent, were first or second in their respective markets, and offered significant growth opportunities. Veteran executives were also shocked that Nevin insisted on investing heavily in expanding Firestone's owned retail operations, which earned returns on assets that averaged 3 percent despite favorable transfer prices.

Ironically, it appears that the very steps Nevin took to break Firestone's inertia gave rise to a set of processes and strategic frames that locked the restructured organization into a new pattern of continuous restructuring and hindered efforts to grow profitably. After eviscerat-
ing Firestone’s bottom up capital budgeting process, Nevin imposed a top down procedure in which he dominated the company’s allocation of capital, presenting his proposals directly to the board and unilaterally rejecting capital requests if he was dissatisfied with the underlying assumptions or analysis.125 “Nevin made all the decisions as to who got capital,” former Vice President Roy Gilbert recalled, “he invested in a few businesses, others got shut down, but he called the shots.”126

This top-down process left the company’s capital budgeting process very susceptible to the strategic frames of one man at the top of the organization. Early in his tenure, Nevin adopted a view which one of his colleagues characterized, “if it doesn’t relate to rubber, I’m going to sell it” and this led to Firestone’s rapid divestment of non-tire businesses.127 Although company veterans realized the potential for profitable growth some of these businesses offered, the top down process failed to capture their knowledge. Based on his experience at Zenith, Nevin saw growth in tire retailing where incumbent managers saw only headaches. Only two months after joining the company, Nevin informed the board “I concluded long ago that a first-rate retailing organization is an absolute requisite for the success of any consumer product manufacturer.”128 Although the stores barely managed to break even, Nevin continued to invest in the business without applying the same level of analytical scrutiny he brought to bear on other divisions, leading one senior manager to conclude that “John loved the stores ... he was completely irrational on the subject.”129 The top down investment process lacked the checks and balances required to temper some of Nevin’s enthusiasm.

After an initial surge in 1980 and 1981, Firestone’s returns to shareholders of 9.3 percent in the subsequent seven years lagged both the tire industry returns of 15.9 percent and the S&P of 15.1 percent.130 Despite continuous restructuring, Firestone attracted the attention of two corporate raiders in 1982, when both the Loews Corporation and Carl Icahn made unsolicited takeover bids for the company.131 In March 1988 the Japanese tire maker Bridgestone offered $80 per share for Firestone, a 167 percent premium over the stock’s...

125 Minutes of the Board of Directors’ Meeting (28 Feb. 1981); Nevin interview.
126 Gilbert interview. See also Brodeur interview.
127 Reese interview. See also Brodeur and DiFederico interviews.
128 Transcript of John Nevin’s Remarks to the Annual Stockholder’s Meeting (9 Feb. 1980); 2.
129 Gilbert interview. Other interviewees made the same point, see Consultant and DiFederico interviews.
130Sull, “Organizational Adaptation and Inertia.”
1987 closing price, trumping a lower offer made weeks earlier by Italian tire maker Pirelli. John Nevin was very pleased with the Bridgestone merger:

Of all the decisions I've made in my recent tire career, this is the first one I would call a "win-win" situation—because it benefits shareholders, employees, customers, and all of the areas where we have operations.\footnote{\textit{Ackerman, "Firestone, Inc."}, 19.}

Thus the Firestone Tire & Rubber Company ceased to exist as an independent entity eighty-seven years after its founding.

\textit{We're The Other Guys, Remember}

Although ultimately ineffective, Firestone's response to radial tires was eminently understandable. In rising to industry leadership Firestone forged a strategic world-view, set of processes, relationships and corporate values which enabled its initial success. The company later refined this winning formula to defend its leadership position. When faced with the discontinuity in technology posed by radial tires, Firestone managers responded not by doing things differently but by doing more of what had worked in the past. Over time a gap emerged between the actions necessary to succeed in the market and Firestone's established activities. By 1979 the gap had grown to a chasm and the company was poised on the brink of bankruptcy. Once the situation had reached a crisis, the Board of Directors looked outside for a president unencumbered by Firestone's administrative heritage to restructure the company.

John Nevin did the job the board had hired him to do, and within a few months he radically changed every aspect of Firestone's competitive formula. He brought in other managers from outside the industry who saw the world differently, he re-engineered Firestone's capital budgeting process, he severed long-standing relationships with employees, customers and host communities and replaced Firestone's "family values" with a pay-for-performance ethic. In the late 1970s, Firestone resembled a person who ignored increasingly severe chest pains and persisted in unhealthy habits until a major heart attack required radical surgery. Nevin saved his patient, but the radical surgery sapped Firestone's long-term health and impaired its ability to thrive in the future.
In broad strokes the Firestone story represents an archetypal pattern of how successful companies respond to major changes in their competitive environment. Companies tend to persist in well worn behaviors until deteriorating performance triggers a crisis and an outsider comes in who changes all elements of the firm’s winning formula simultaneously. This pattern is consistent with prominent examples of restructuring such as Tom Graham at U.S. Steel, George Fisher at Kodak, Ann Iverson at Laura Ashley, or “Chainsaw” Al Dunlap at Scott Paper.

This pattern not only describes many well known restructurings, but also bears out the predictions of a prominent theory of strategic change. Punctuated equilibrium theory postulates that organizations have “deep structures,” consisting of components like Firestone’s strategic frames, processes, relationships, and values. Because these components are interdependent and mutually reinforce one another, they resist piecemeal change. This deep structure, as a result, locks organizations into long periods of stability when none of the pieces change fundamentally. If performance deteriorates, however, managers (generally outsiders) lead revolutionary change by completely dismantling the deep structure and replacing it with a new one. This pattern gives rise to the name “punctuated equilibrium.”

Given the strong theoretical predictions and conspicuous empirical examples, one might expect that Firestone’s rivals followed the same pattern in response to radial technology. B.F. Goodrich, however, provides a fascinating counter-example to the predictions of punctuated equilibrium theory. In an attempt to distinguish their brand from Goodyear’s, B.F. Goodrich launched an advertising campaign in the 1960s with the tag line “we’re the other guys, remember.” The slogan could as easily describe the company’s response to radials which differed from that of the other four tire majors at every turn. While the other leading U.S. tire firms neglected radial tires in the 1960’s, Goodrich broke ranks with its traditional rivals and introduced the first U.S. manufactured radial tire in 1966, and supported the product launch with its “Radial Age” advertising campaign in 1968. B.F. Goodrich’s


134Blackford & Kerr, B.F. Goodrich, 317.

135Sull et al., “Managerial Commitments,” 491- 494.
management hoped to win share from its larger competitors by introducing the new technology before they did.¹³⁶
B.F. Goodrich’s management bet heavily on radials but lost that bet when none of its competitors followed suit. Led by Goodyear, BFG’s competitors took steps to thwart Goodrich’s radial initiative by refusing to act as second suppliers to the auto companies, aggressively promoting the belted-bias as an alternative technology and—in Goodyear’s case—outspending Goodrich four-to-one in a television advertising campaign casting doubts on radials’ benefits.¹³⁷ When Goodrich’s bet failed to pay off, the company’s poor performance attracted the unwanted attention of Ben Heineman, who launched a hostile takeover bid in January of 1969.¹³⁸ Goodrich CEO Ward Keener forcefully defended the company’s independence, and erected a series of barriers to prevent Heineman or any other raider from gaining control by placing 9 percent of BFG equity in friendly hands, arranging a Congressional hearing and lodging an objection with the Securities and Exchange Commission. Goodrich’s defenses appeared insurmountable, and after a brief siege, Heineman retreated.

Thus, Goodrich’s crisis passed, leaving the company better fortified against external threats in the future. Rather than breathe a sigh of relief and return to business as usual once this crisis had passed, however, Keener decided that drastic actions were required to improve the company’s financial performance. To increase profits in the tire business, B.F. Goodrich’s top management decided to explore options to merge with another tire maker.¹³⁹ Since the Justice Department would probably oppose further concentration of the tire industry through the merger of the tire domestic competitors, Keener approached Michelin and initiated secret discussions, which ultimately collapsed when Michelin officials demanded they lead any joint-venture. even in B.F. Goodrich’s core North American market.¹⁴⁰ Keener’s subsequent efforts to reverse Goodrich’s declining fortunes met with little success.

By 1970, Keener recognized that he was not the right man to lead the radical restructuring BFG required.¹⁴¹ Keener recommended that the board look outside the firm for his replacement, but was surprised by the enthusiasm with which the directors embraced his advice. In 1971 the board abruptly replaced Keener—prior to his scheduled

¹³⁶ Blackford & Kerr, B.F. Goodrich, 276.
¹³⁷ Ibid., 277–278. Love & Giffels, Wheels of Fortune, 146.
¹³⁸ Blackford & Kerr, B.F. Goodrich, 290–292.
¹³⁹ Ibid., 278–9.
¹⁴⁰ Ibid.
¹⁴¹ Ibid., 296–7.
retirement—with O. Pendleton “Pen” Thomas, a highly regarded executive from the Atlantic Richfield Oil Company. Thomas tapped outside managers to assemble his team, and by 1972 the majority of Goodrich’s top managers came from outside the company, and none of the top seven were Akron natives.\textsuperscript{142}

At first glance, B.F. Goodrich’s response bears a striking similarity to Firestone’s: a crisis motivates the board to bring in an outside leader to clean house. Goodrich’s response differed, however, in the magnitude of the crisis that provoked the executive change as well as the timing of the restructuring. Both of these differences had profound implications for how B.F. Goodrich responded to the radical revolution. While Firestone’s directors delayed radical steps until the company was nearly bankrupt, the B.F. Goodrich’s board acted when the company’s position in 1971 was still relatively strong. While the low profitability that had attracted Heineman persisted, BFG’s balance sheet was still sturdy, and the company was well fortified against hostile takeover bids in the wake of Heineman’s unsuccessful raid. While Firestone’s board failed to act decisively until the company suffered the corporate equivalent of a major heart attack, B.F. Goodrich’s directors took drastic steps after surviving the first bouts of angina. By acting before Goodrich’s financial and strategic situation deteriorated severely, Goodrich’s board gave the newly appointed CEO the luxury of time which Nevin lacked.

Thomas used his time well. He quickly divested several unprofitable businesses outside the core tire operations. While Thomas and his team continued to invest in tires, they carefully monitored the resulting returns. A 1977 post-completion study of major capital investments revealed that eight major projects to increase radial capacity had delivered only one-third of the projected sales increase and just one-tenth of the forecasted incremental profits.\textsuperscript{143} By the late 1970s, Thomas and his management team codified their growing misgivings about the tire business into an explicit strategy to milk their tire division and to reduce capital spending to the bare minimum necessary to maintain the business as an attractive acquisition for another tire company.\textsuperscript{144} Thomas and his team had decided that when it came to tires, it was better to quit than fight—a conclusion that Nevin would reach several years later.

\textsuperscript{142}Sull et al., “Managerial Commitments,” 492.
\textsuperscript{143}Ibid., table 7.
\textsuperscript{144}Blackford & Kerr, B.F. Goodrich, 309-10.
Thomas’ early recognition that going it alone in the tire industry was not an attractive option for B.F. Goodrich allowed the company to avoid many of the costly investments that sapped its rivals of their financial vitality. Alone among the major American tire makers, Goodrich avoided the large investment necessary to build a new factory dedicated to radial production. While other tire companies continued to fight tooth and nail for share in the unprofitable OEM market, B.F. Goodrich focused on the more attractive replacement market. In January of 1981, B.F. Goodrich took the dramatic step of abandoning the OEM market altogether, although the company had served Detroit since 1896 and sales to automakers still accounted for 10 percent of total revenues. B.F. Goodrich was also the most aggressive company in exiting from redundant bias tire production. Goodrich drew first blood among the Big Five when it closed two bias plants in 1975, two years before any other major tire manufacturer did so.

The steps taken by B.F. Goodrich managers paid off. Between 1971 and 1981, Goodrich rose from the least profitable to the most profitable tire company in the industry. In 1986, the company merged its tire operations with those of Uniroyal, and two years later sold their 50 percent stake in the merged Uniroyal Goodrich Tire Company. Thus, BFG management finally achieved their goal of exiting tires to focus on more promising lines of business.

Conclusion

This study of Firestone Tire & Rubber’s response to foreign competition and new technology yields intriguing insights into how industry leaders respond to changes in their competitive environment. Faced with obvious technical innovations or aggressive new entrants, incumbent leaders are often accused of inertia, and sometimes compared to the proverbial deer frozen in the headlights of an oncoming automobile. Firestone, however, clearly did not react to radials by doing nothing: The company rapidly developed a belted bias tire to meet Goodyear’s offering and invested heavily in radial production capacity once Detroit’s automobile producers switched to radials. While inertia is often equated with inaction, the term can also refer to the tendency of a moving object to persist in an established trajectory in the face of outside force. I define the term “active inertia” to describe an organi-

145 Blackford & Kerr, B.F. Goodrich, 363.
146 Sull et al., “Managerial Commitments,” table 5.
zation's tendency to persist in the activities that contributed to its past success despite even the most dramatic changes in its competitive environment. Faced with new technology and aggressive foreign competition, Firestone responded with active inertia rather than inaction.

Firestone's active inertia raises the questions of what forces lock established competitors into historical responses. This paper identifies established strategic frames, processes, relationships and values as the key structural elements that channeled Firestone's response to radial tires into well-worn grooves. Firestone managers looked to Akron for competitors, to Detroit for customers and to the future for growth, but these strategic frames blinded them to the hard realities of the radial age. Firestone's processes for developing new products and allocating capital were well suited to incremental product extensions in a growing market, but inappropriate for adopting discontinuous product technology and closing redundant plants. The values embodied in the notion of the "Firestone Family" were manifest in deep relationships with customers and employees, were instrumental in growing the company, but became chains that bound Firestone managers to the past when the environment changed dramatically.

The active inertia framework builds on an influential stream of research analyzing how firms' investment processes influence their response to technological changes. Carliss Baldwin and Kim Clark argue that capital budgeting processes developed and honed by large American firms after the Second World War enabled these companies to conduct sophisticated analyses of investment proposals whose benefits were easy to quantify, but their processes hindered them from evaluating investments that defied quantification. Because investments in capabilities were difficult to quantify, large firms systematically underinvested in the integration capabilities critical to their long-term success. In a series of influential publications, Clayton Christensen has demonstrated that the resource allocation process within established firms systematically favors existing customers at the expense of potential future customers.

The Firestone history reaffirms the central role that companies' investment processes play in channeling their response to new technol-

13Sull, "Why Good Companies Go Bad."
ologies. This paper contributes two insights to previous research on the investment process. First, the Firestone history highlights the importance of the capital budgeting process not only in shaping investments in new technology, but also in influencing the timing of exit from old technology. Firestone’s delays in closing unnecessary bias factories resulted in cumulative pre-tax losses in excess of $350 million in the 1970s, compared to the company’s total market capitalization of $500 million when Nevin became CEO.\footnote{Sull, “Organizational Adaptation and Inertia,” 98.} Second, the Firestone history also demonstrates that a bottom-up investment process well suited to investments for traditional customers can stall in reverse and fail to promote necessary disinvestment from old technologies.

Christensen argues that a company’s resource allocation process is influenced by its relationships with established customers, and ties to Ford clearly influenced Firestone’s willingness to invest in radial technology despite the poor financial returns.\footnote{Christensen, The Innovator’s Dilemma, 42-45.} The Firestone history suggests that the investment process is also deeply intertwined with a company’s strategic frames, relationships with employees and corporate values. Firestone’s continued investment in tires resulted in part from managers’ mindset that tires was a growth market, just as it had been for the preceding decades. Firestone managers’ relationship with employees slowed the process of closing redundant bias plants. The incumbent managers who first faced the radial threat in the 1960s and 1970s were deeply steeped in the company’s “family values,” which increased the difficulty of closing factories even when the economic case for doing so was compelling.

Street provide compelling evidence to support these economists’ arguments.

Akron’s tire industry was one of America’s most dynamic and technically exciting industrial clusters at the turn of the century. In the 1920s the rubber industry was the second most research intensive industry in the United States, measured by the ratio of research workers as a percentage of total employees, and this research increased both product design and productivity. Improvements in tire design dramatically improved tire wear in the industry’s first three decades, as the average tire service life increased from 2,000 miles in 1908 to 22,000 miles by 1932. Labor productivity increased from an average of thirty tires per man-hour in 1914 to 160 tires per man-hour in 1935, the greatest percentage rise in labor productivity of any American industry over that time period. In the wake of the radial revolution, however, three of Akron’s four tire leaders were relegated to the ash-heap of history. Nor was the tire story an isolated example. Once vibrant clusters centered around steel in Pittsburgh, automobiles in Detroit, minicomputers in Boston, watches in Geneva and cutlery in Sheffield, and all suffered similar fates.

Elsewhere, I present a framework of how industrial clusters evolve over time to help explain how once vibrant clusters lose their dynamism. In the early stages of an industry, according to this model, industrial clusters attract entrepreneurs because they provide ready access to specialized resources, including labor, funding and knowledge necessary to form a new venture. At the turn of the century, Akron provided the aspiring tire magnate a large pool of skilled tire workers and engineers, specialized equipment manufacturers and with Buchtel College a center of expertise in rubber chemistry. Because executives in an industrial cluster closely monitor local rivals, quickly imitate best practices and rapidly hear the latest industry gossip, they may be better positioned to thrive than firms outside the cluster in an industry’s turbulent early days. Over time, however, the firms within a cluster may converge on a similar mode of competition—“how we do things around here.” This shared way of doing things is reinforced by

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154 For information on research intensive industries, see Chandler, Scale and Scope, 108.
155 Jeszkeck, “Plant Dispersion,” 596.
the dense interweaving of social and professional networks within the cluster. Executives in Akron’s tire industry all read the Akron Beacon Journal, lived in the same five block radius and socialized at the same country club. Sanctified by precedent and reaffirmed by competitors following the same rules, the established way of doing things within an industrial cluster can assume a taken-for-granted character and become institutionalized.158 Faced with an exogenous shock that challenges every aspect of their modus operandi, firms within clusters struggle to adapt.

The Firestone history also highlights the difficulties of assigning industries to broad categories based on technological intensity. In his review of U.S. industrial enterprises since the Second World War, Chandler classifies industries into three categories—i.e., “high-tech,” “stable-tech,” and “low-tech”—based on their level of R & D intensity. Chandler uses his taxonomy to draw inferences about firms’ mode of competition based on their level of technical intensity.159 While the simple categories that Chandler proposes illuminate broad trends in the economy as a whole, they can also obscure important characteristics of individual firms and industries. Chandler classifies the tire industry (S.I.C. 30) as a “stable-tech” sector, where “the final product has historically remained much the same. Here competition ... is based more on the improvement of the existing product and processes, on better marketing and distribution, and on better relations with suppliers and the work force.”160

One can imagine that most tire industry executives in the late 1960s would have heartily agreed with Chandler’s description of their industry, and therein lies the danger. Firestone’s managers were blindsided by the magnitude of change wrought by radical technology, at least in part, because they framed their industry as stable and immune to major shifts in technology. The mistaken assumption of industrial stability may also help explain why American steel producers were so slow in coming to terms with mini-mill technology, and Detroit’s tardiness in responding to the fuel-efficient cars manufactured by Japanese competitors.

The findings from the Firestone case study also suggest a possibility to extend life-cycle theories of industry evolution. In a series of theoretical and empirical studies, Steven Klepper has examined the

160 Ibid., 24-5.
evolution of industry structure in new sectors.\textsuperscript{161} Klepper argues that nascent industries pass through three stages—i.e., an early growth phase during which many new competitors enter, a "shake-out" period when many firms exit in a short period of time, and a maturity phase characterized by limited entry and gradual attrition of incumbents. The industrial restructuring triggered by the adoption of radial tire raises the intriguing possibility that mature industries may be vulnerable to a second "shake-out" precipitated by major changes in technology (e.g., tires, minicomputers), consumer preferences (e.g., tobacco), or regulation (e.g., airlines, telecommunications). Shocks arising outside the industry's traditional boundaries may prove particularly vexing.

Chandler has provided a parsimonious theory and compelling evidence that during the Second Industrial Revolution those firms that invested earliest to build economies of scale and scope secured defensible positions for decades to come. The importance of these first-mover advantages ranks among the most powerful and best-established insights from the historical analysis of business. Firestone was an archetypal first mover and secured a leading position in the tire industry through the first three-quarters of the century. Yet the very formula which enabled its initial success hindered its subsequent ability to adapt to major changes in this competitive environment. When faced with major changes that could trigger a second shakeout, established companies are often constrained by their legacy and may suffer from a first-mover's disadvantage.

The decline and fall of great institutions has intrigued historians from Herodotus and Thucydides through Gibbon, Spengler, and Toynbee. The increasing pace of technical innovation and global competition have placed great pressure on many of the corporate empires which have dominated their industries since the Second Industrial Revolution. The Firestone case study revisits the enduring theme of how success breeds failure in a modern business setting, and despite its modest scope aspires to shed some light on the dynamics of standing still.