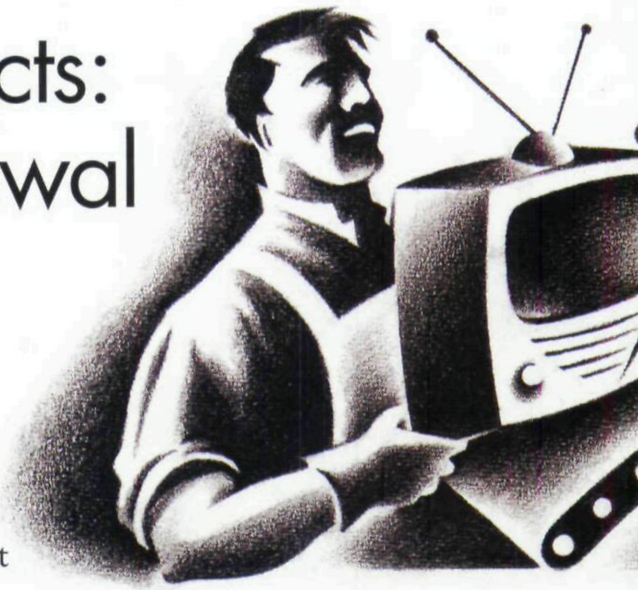
Development Projects: The Engine of Renewal



by H. Kent Bowen, Kim B. Clark, Charles A. Holloway, and Steven C. Wheelwright

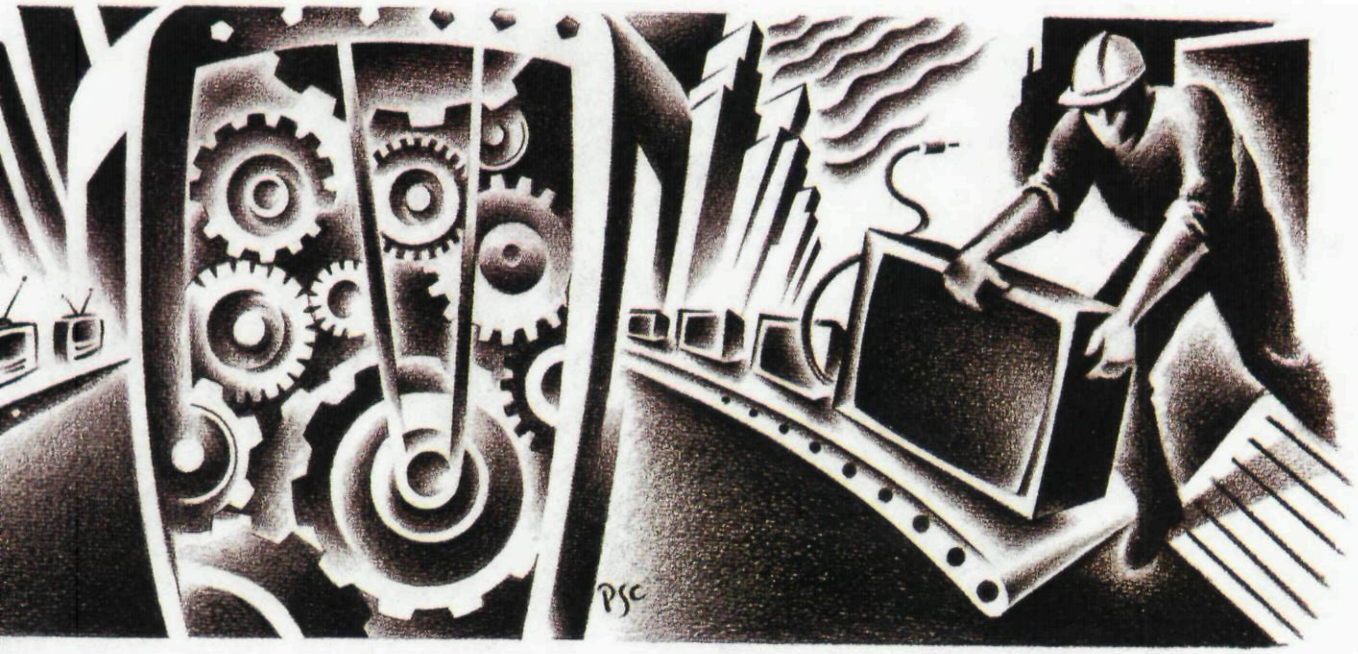
Digital Equipment's effort in the 1980s to develop high-density disk drives is an outstanding example of how a company can use a development project to create not only a new product or process but also a competitively important expertise. The undertaking, known as the RA90 hard-disk-drive project, also demonstrates a critical truth about development projects that managers often miss: the resulting capability can be and often is more important than the product itself. Indeed, by many measures, the RA90 project was anything but a total success. However, the capability gained laid the foundation for a generation of products that significantly enhanced DEC's competitiveness.

At the end of the 1970s, Digital, the world's second largest computer maker, found itself in a serious predicament: it was about ten years behind the state of the art in a key computer component, magnetic storage systems. Senior managers felt this area would be increasingly important for the company to retain its leadership position. Some executives spotted the emergence of two dramatically new technologies on the competitive landscape: thin-film magnetic storage media and thin-film heads for reading and writing the media. If DEC could master these technologies, they believed, the company could leapfrog the existing leaders in the field and become a major force in hard-disk-drive systems. By the early 1980s, DEC had progressed enough with the technology that it could launch a major effort. The result was the ambitious RA90 project, one of the largest development efforts in the company's history.

The project's success required four significant breakthrough innovations: the thin-film media and the process to manufacture it; the thin-film head and its process; a new electromechanical drive system; and a new process for assembling the components into the final system. Based on R&D estimates of where leading competitors might be in three to five years, senior managers set highly ambitious cost and performance targets for the product. They marshaled a phenomenal amount of resources in terms of money and talent, recruiting people from both inside and outside the company to work on the project.

The original specs called for a 9-inch drive with a storage density of 30 million bits per square inch. But after two of its engineers visited Japan and found Fujitsu planning to develop a drive with a density of 45 million bits per square inch, DEC upped its goal to the same level. Development of parts of the drive, notably the read/write heads, was already proving difficult, and the more ambitious density target created undue risk, frustration, and delays. DEC finally shipped the RA90 in 1988, two years late. The final product cost, originally targeted at $2,500, had risen to $5,000. Even more traumatic for the company was the fact that the industry was moving to smaller drives by this time, so the 9-inch drive would soon be obsolete.

DEC also never achieved the 45-million-bit mark and had to settle for 40 million bits. But Fujitsu had also failed to reach the 45-million-bit mark, and the state of the art for the rest of the industry by 1988 had risen to only 30 million bits.



If DEC executives had not panicked after the visit to Japan and set a course for 40 million bits, they could have saved significant time and expense. In hindsight, they also could have done a better job integrating the efforts involved in developing the drive's major subsystems. But the project nonetheless succeeded in achieving an important strategic goal. It gave DEC what it needed to become a leader in disk drives: state-of-the-art capabilities for making thin-film media and heads and designing and assembling high-performance disk-drive systems.

By wisely selecting the projects it undertakes, a manufacturer can use them to develop new skills, knowledge, and systems.

The RA90 effort shows how a manufacturing company can build new capabilities by consciously using development projects as agents of change.

Learn Through Development

There are several reasons why development projects provide the best opportunities for a manufacturing company to renew itself constantly so that it can attain and then retain a leadership position. The most obvious reason is because development projects are where new products and processes are created. But, equally important, a company, by wisely selecting the projects it undertakes, can use them to develop new skills, new knowledge, and new systems.

Why is a development project such a good place for this? A development project is a microcosm of the whole organization. A project team is made up of people from many areas of the company. A team's success is determined by the integrated outcome of everyone's work. The teams must also interact with suppliers and customers. Moreover, because development projects typically are conducted under intense time and budget pressures, they usually magnify the strengths and weaknesses of a company, including its people, systems, and culture. Development projects provide a comprehensive, real-time test of the systems, structures, and values of the whole organization. And most projects are sufficiently limited in duration and scope to enable a company to use them to experiment without incurring major risk.

If employees are taught that every project has two dimensions – that what matters is not just the resulting product or process but how the result is achieved – they will take to heart the idea that learning is a primary goal for everyone in the organization. Without exception, the most successful projects that the Manufacturing Vision Group examined were those in which the teams operated in

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Members of the Manufacturing Vision Group

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a learning environment. People learned from previous projects, advanced their skills during the course of their project, and applied what they learned to renew the company's capabilities. Conversely, the unsuccessful projects typically operated in an atmosphere that did not emphasize learning. Two efforts at Ford – to develop an air-conditioner compressor for automobiles and to create the 1989 Thunderbird – demonstrate how effective corporate learning occurs in development projects only if management makes the learning of specific things an explicit project goal.

Ford decided in 1986 to develop an air-conditioner compressor in-house for the first time after it was stung by Nippondenso. Shortly after Ford paid Nippondenso to license compressor technology, the Japanese components supplier unveiled an improved compressor that it was making available to other carmakers. Outraged, executives at Ford decided to give the company's climate-control division the challenge of creating its own compressor-design capability.

In setting the goals for the project, the division's managers decided to shoot high. Their goals were to develop a compressor that would outperform but cost less than Nippondenso's; to develop it very quickly (in two years); and to put designers, manufacturing engineers, machining specialists, and assemblers from the division on the same team and in the same place. Getting these 17 people together was a revolutionary concept at Ford, where people in different functions, particularly those in design and manufacturing, normally worked at arm's length. Ford managers had two reasons for setting this last goal. First, they thought there was no other way to create the compressor so quickly. And second, they saw the project as a laboratory where the group could figure out how to integrate design and manufacturing functions, thereby producing a new development capability for the company.

By several measures, the project was a success. The resulting FX15 compressor performed better than Nippondenso's, was less expensive, and was much easier to manufacture, proving the value of integrating design and manufacturing. While the development process used was far from perfect, it laid the foundation for a new process that Ford could use in other projects. The climate-control division continually improved the integrated cross-functional approach in other endeavors. Ultimately, the approach enabled Ford to reduce the time and money required to develop new products.

In contrast, during development of the 1989 Thunderbird, Ford missed a golden opportunity to create an increasingly important capability in the automobile business: integrating the work of research and advanced-technology development directly and effectively with commercial automotive products. Traditionally, groups that do research and create advanced technology for U.S. carmakers have lived in their own world. A team would develop new knowledge about components or materials and put it on a shelf along with an array of other insights and technologies. The engine- or car-development teams would then occasionally search through them, shopping for solutions to specific problems. But not everyone would shop, and not everything on the shelf was useful. Moreover, those who found something with potential often discovered that the new technologies could solve commercial problems only after a lot more time-consuming, expensive work. While it is important to have critical advanced technologies fully or partially developed before major product-development efforts proceed, this approach has usually resulted in neither fast nor effective product introductions.

As Ford realized after the fact, it could have used the Thunderbird project to break out of this rut by figuring out a way to link research and advanced technology more effectively with the development of a new component – in this instance, a new supercharged engine – that fit a new car model's specific needs. But senior managers failed both to make this an explicit project goal and to think through how the project should be organized in order to achieve the necessary coordination.

Besides calling for a new engine design, the Thunderbird required a new car platform. Following standard practice, Ford managers treated the engine, including the development of the supercharger, as a separate project and spread the detailed work for the rest of the project (all of the car except the engine) among traditional functional groups. About halfway through the project, Ford put a new manager in charge of the entire project. Even so, the separate teams were not closely integrated.

The lack of integration between the engine work and development of the rest of the vehicle created significant problems for the project. Late in the timetable, the supercharged engine had to be redesigned because it ran into unexpected durability and performance problems due to the supercharger. These problems probably could have been avoided had the engine group been plugged into the advanced-technology-development group that had been conducting research on supercharging, but it was not. Eventually, Ford did get a supercharged Thunderbird. But the process it had used – with its multiple, unplanned design iterations, long delays, and substantial weight and cost overruns – was not one it would ever want to repeat.

When the Manufacturing Vision Group reviewed the project, it discovered that the supercharger episode had surprised a number of executives at Ford. They were surprised because Ford had formed cross-functional planning groups of senior managers and senior staffers to think about future technology needs. One reason for forming the groups was to provide guidance for research work, which they did. But the executives wrongly assumed that the groups would also naturally serve as a link between research and the operating engine-development groups, thereby making sure the latter would tap the former's knowledge. But those links never materialized at the working level. By managing the project as they did, Ford executives ensured that the project was not the powerful agent of change for the company that it could have been.

Seven Elements for Breakthrough Learning

As the Ford and Digital examples demonstrate, development projects can be designed and managed so that they continually generate powerful, distinctive capabilities as well as winning products or processes. The Manufacturing Vision Group found seven key elements, which, when applied holistically, optimized development, fostered learning, and initiated change throughout an organization. Without exception, the most successful projects masterfully combined all these elements; inevitably, those that failed were lacking in one or more.

Core Capabilities. The attributes of a company that enable it to serve customers in a unique way, distinguishing it from its competitors, are its core capabilities. These include knowledge and skills, managerial systems, manufacturing processes, and values – the attitudes, behaviors, and norms that dominate in an organization. In the best-managed companies, core capabilities naturally grow stronger with each development project and are leveraged in a way that enables a company to do things its competitors cannot. But there is a dark side of core capabilities that managers often overlook: if a company fails to update or replace core capabilities as its industry evolves, they can become *core rigidities* that can thwart needed change.

Guiding Vision. A clear picture of the future, a light at the end of the tunnel that serves as a focal point for daily work, is the guiding vision of a company. Such a vision is not a specific goal but a general destination that describes what must be accomplished and why, and leaves room for individuals to determine how to get there. A company needs integrated or synergistic guiding visions for products, projects, and each line of business in order to create products (or processes) that fulfill an intended set of customer expectations, build enduring capabilities, and support the business strategy.

Organization and Leadership. Companies need a customized system for promoting teamwork and supplying managers to head projects who have a clear concept of what a given product should be, can provide direction, and have decision-making authority. No one organizational structure or type of leadership is best for all projects; a company needs to develop a range of approaches and have a system for matching each project with the approach that best suits its goals and competitive environment.

Ownership and Commitment. A sense of devotion that team members feel toward a project defines their ownership and commitment. Skillful managers and good company practices can bolster ownership and commitment among employees.

"Pushing the Envelope." The practice of constantly making improvements to a company's products, processes, and capabilities on a broad front is called pushing the envelope. This practice creates a tension in carrying out work that is necessary for reaching ever higher levels of performance.

Prototypes. Models, mock-ups, and computer simulations of the product or process created at strategic junctures in development projects are called prototypes. They help employees solve problems and learn faster and better, and they help create a common language that knits a team together.

Integration. To optimize work, companies need a system to promote joint decision making among all functional units and divisions involved in the project. Integration is much more than coordination; it redefines work content and individual tasks to maximize the efficiency of the whole development team.

The careful attention that Chaparral Steel paid to all of these elements explains why its horizontal caster project was so successful. From nothing when it was founded in 1975, Chaparral, a minimill located in Midlothian, Texas, has mushroomed into the nation's thirteenth-largest steelmaker. How did Chaparral achieve its breathtaking growth? First, Chaparral managers have always believed that there is no limit to how much conventional processes and equipment can be improved. As a result, Chaparral has repeatedly shattered the conventional industry wisdom about how much a given piece of equipment can produce or the tolerances that it can achieve. And second, Chaparral has disproved the presumption that minimills can produce only low-grade commodity steel.

Chaparral's development of the industry's first horizontal caster shows how nothing is impossible if the seven elements are married to a deep knowledge of process and product technology. Minimills consist of three basic parts: an electric-arc furnace, a caster that converts the liquid metal to solid billets, and a rolling mill to create the final shapes. Like all other minimills, Chaparral used a vertical caster, which imposed a ceiling on the quality of the steel it could produce. In the early 1980s, Chaparral executives decided that the company was constraining itself by defining growth to mean producing more of the same low-grade products. Determined to make more high-grade, higher-margin products and expand the areas in which the company competed with the big, vertically integrated steelmakers, the executives said, "If the vertical caster is the obstacle, then let's remove it."

> Chaparral's attention to seven crucial elements enabled a team to expand its knowledge and create a breakthrough caster.

Chaparral's deep understanding of the vertical-casting process led it to the elegant conclusion that casting horizontally would be the ticket to making new high-grade products. When its managers learned that earlier experiments with the horizontal casting of steel had failed, they looked outside their industry and discovered a half-dozen sites around the world where aluminum and copper (metals that are much easier to cast) were being horizontally cast.

In 1984, the executives formed a project team, including line operators, to visit all these casting sites. Afterward, combining what they saw with the knowledge they already had about steel casting, the team members came up with a radically new concept for a horizontal caster, which, they thought, just might work. At first, Chaparral contracted an engineering company to build a prototype caster at the latter's own site. But managers soon realized that their company wouldn't gain the insights it needed to make the caster work unless they put the prototype on the shop floor where employees could constantly experiment with it.

Performance of Projects

Company and Project	Met schedule	Initial market acceptance	Met technical objectives	Met business objectives
	Degree of Success in Meeting Objectives			
Chaparral Steel				
Digital pulpit controls for arc furnace	2	5	5	5
Electric-arc saw	2	NA	1	1
Horizontal caster for high-grade steel	3	4	5	4
Microtuff 10 – new forging steel	4	4	4	5
Digital Equipment				
CDA – desktop publishing software	3	4	4	4
DECstation 3100 – UNIX workstation	5	2	5	3
LAN Bridge 200 – local area network	2	4	3	4
RA90 – high-density disk drive	2	3	3	4
Eastman Kodak				
Antistatic film coating (Chem. 181)	5	5	5	5
"Factory of the Future" – 35mm film	1	NA	2	2
FunSaver – "single-use" camera	5	4	5	4
Panda – large-format printer	1	4	4	3
Ford Motor				
1991 Crown Victoria/Grand Marquis (EN53)	2	3	5	4
FX15 Air-conditioner compressor	4	2	3	3
1988 Lincoln Continental (FN9)	2	4	4	2
1989 Thunderbird/Cougar (MN12)	4	3	4	2
Hewlett-Packard				
DeskJet – ink-jet printer	4	5	5	5
Hornet – spectrum analyzer	4	5	5	5
HP 150 – computer to use as a:				
terminal	4	4	4	2
personal computer	4	2	4	2
Logic analyzer – digital oscilloscope	3	4	4	5

Relative Success Ratings 5 = very high 4 = high 3 = medium 2 = low 1 = very low NA = not applicable

By mid-1985, five Chaparral shop-floor operators had tinkered enough with the caster that it occasionally produced billets successfully. Over the next two years, the company purchased and modified pieces of equipment and eventually built a pilot production line. By mid-1988, Chaparral had built a full-fledged production line, which employees ran and refined continually into the next year.

Even then, when the caster seemed ready for full-scale, commercial production, the Chaparral team did not give up its quest for learning. "With what we know now, we might be able to learn more from the casters that we examined originally," the team members decided. So they revisited all the sites and found they were indeed able to refine their caster further. After the caster was operating fully, Chaparral continued to press for ways to improve it and ended up investing in new mechanical drives and controls. In 1990, thanks to the horizontal caster, Chaparral produced 300,000 tons of steel whose quality was even higher than the company had hoped at the project's outset. It was an amazing technical feat for any steelmaker, let alone a minimill with fewer than 1,000 employees.

The horizontal caster project leveraged several of Chaparral's core capabilities. These included its ingenuity in taking existing manufacturing equipment (in this case, from other industries) and getting it to do something that had never been done before and its exceptional ability to train and broaden the knowledge of people at every level of the company. In other words, the project's scope and technical challenges were aligned with one of Chaparral's core strengths: continuously advancing the art and science of casting steel products.

Companies need systems for applying what was learned in one project to another.

There was also a compelling harmony between this project's goals and the company's overarching vision, which was to be the leading international low-cost supplier of high-quality steel products. No one on the team ever had any doubts about the project's ultimate goal. And even though it was a breakthrough project, the undertaking was totally consistent with Chaparral's view of life: that a company must relentlessly push the envelope to be a leader, a passion that obviously infected the team. The knowledge that they could make a tremendous difference and that they would ultimately operate the caster infused team members with a sense of ownership and reality that indisputably contributed to the caster's great technical and commercial success. The fact that the team members, like everyone at Chaparral, were stockholders gave them even more of a stake in the project's outcome.

The fact that the team leader had a lot of experience heading development projects at Chaparral and had deep technical knowledge of casters certainly did not hurt. This was not simply the luck of the draw. At Chaparral, virtually everyone is involved in a development or improvement project at any moment in time. People may lead one team and then be members of another, an approach that has produced a broad array of people who know exactly how to lead a given project or how to make effective contributions as team members. And at Chaparral, unlike many other companies, careful thought goes into choosing both the leader and the members of every project and into how the project is organized. For example, Chaparral classified the horizontal caster as an "advanced development project" and accordingly assigned it to one of its seven general foremen who reported directly to the vice president for manufacturing. That step ensured that the horizontal caster would be integrated into the manufacturing process.

The way the caster project evolved seamlessly from idea to crude concept to prototype to pilot to full-scale production was no accident. This smooth evolution was the result of the masterful way the team members integrated their work. Besides sharing the vision, everyone on the team had worked in a variety of functions, which was not unusual at Chaparral, where functional fiefdoms are verboten. The team's rigorous use of prototypes, starting with a small primitive one and then moving steadily toward a preproduction version, also helped team members understand how each person's contribution affected and meshed with everyone else's. And because each person knew that at some point he or she would be responsible for running the actual machine, everyone focused on the whole, not on the parts.

Learning from Post-Project Reviews

As the leaders of Chaparral understand, the key to becoming and remaining a leader is not just getting it right one time but developing a system for applying what was learned in one project to subsequent projects. Companies that excel in doing this create an atmosphere in which everyone recognizes that learning is the ultimate goal and the most effective way to push the company forward. This requires systematic planning for each project or series of projects that includes establishing realistic goals and conducting a "learning audit" of projects after they have been completed.

Kodak's attempt to build a "factory of the future" for cutting, perforating, winding onto spools, and packaging 35mm film demonstrates the perils of poor planning. In 1984, Kodak saw the need to add substantial finishing capacity and in 1986 initiated a project to fulfill this goal. Kodak put two managers, one from manufacturing and one from engineering, in charge. They agreed that they could use the project both to add the required capacity and to develop a process that had lower operating costs and greater quality control.

But the teams went overboard. Knowing that revolutionary projects like this one don't come along very often, they tried to cram all sorts of experimental production technologies into the project. The project soon became bloated, and major delays occurred several times. Trying to do everything at once, the teams had lost sight of the primary goal of adding enough capacity so that the company would be able to meet increased demand. Eventually, Kodak executives had to kill the endeavor.

Of the five companies that the Manufacturing Vision Group studied, Chaparral best exemplified how a manufacturing company can use development projects to learn. One of the tenets of its culture – if all employees learn, then the organization will learn – has been instrumental in Chaparral's strong growth.

Chaparral does three things that serve as a model for all companies. First, it requires every development project to advance the company's capabilities. Second, it carefully plans which series of projects to undertake and how to carry them out so that altogether they will strengthen the company's overall set of capabilities. And third, after each project has been completed, Chaparral analyzes it to find out what it achieved or failed to achieve so the operational lessons – not flow charts and organizational structures but the way people actually worked best together – can be passed on to subsequent projects.

During their careers, the members of the Manufacturing Vision Group have collectively studied or participated in hundreds of development projects at numerous companies in a range of industries. Of those companies, many have gone a lot farther in installing effective planning systems for development projects than in installing effective auditing systems. Indeed, only a handful have any kind of auditing system, and often the purpose of those audits is to ensure that the project is complying with bureaucratic procedures rather than to analyze both the positive and negative aspects of the project so the company can learn.

Some of the 20 projects that the group studied were audited after their completion, but the review was not systematic. Sometimes the reviewers were reluctant to highlight problems, fearful that doing so would embarrass people and appear unfair. But companies must strive to change this perception. Otherwise, project after project will experience the same mistakes. For any organization to learn, someone has to step back and ask what a given development team, and the company in support of that team, did right and wrong. Then management must find a way to implement the needed changes in the next project.

Aside from Chaparral, Ford is one of the few companies to have realized this. Recognizing the need to institutionalize learning, in 1985, Ford established a special team of people who were experienced in development. It gave them the mission to develop new concepts, guidelines, and milestones for product development that became known as the concept-to-customer process (CTC). Learning by assessing projects was an important part of the CTC team's work. Each time a project ended, the CTC team reviewed it and involved the members of the project's core team in the process, thereby teaching people how to learn from their experience. The process has evolved into what Ford considers an excellent approach. But this doesn't mean Ford is satisfied. Even though a large number of people involved in development now know how to assess projects effectively, the CTC team continues to strive to improve the process even more.

Pitfalls to Avoid

Apparently, one reason that so few companies audit their projects is the extra expense; this is shortsighted. The fact is, it takes extra time, effort, and money to use development projects to learn. Many people on the projects that the Manufacturing Vision Group studied pointed to things they could have learned had they been given enough time or resources. And careful analysis showed that this was not just typical grumbling. In several instances, the narrow financial perspective of senior managers, an overemphasis on holding down costs, blocked companies from using projects to develop new capabilities that over time would have yielded a handsome return on a relatively minor investment. In other instances, financial myopia interfered with the development of the product itself. The 1988 Lincoln Continental is a case in point.

A classic U.S. luxury car, the Continental had been a strong seller for years. But by the mid-1980s, the luxury models of the Big Three automakers were losing ground to Japanese and European cars that were just as plush but smaller, more fuel efficient, and easier to handle. To counter this competitive threat, Ford executives sought to introduce the concept of "contemporary luxury" with its 1988 Continental.

Ford's plan called for an extensive redesign of the Continental. Realizing that integrated teamwork was critical to the project's success, managers

Most companies do not audit development projects to find out what they learned or failed to learn – and why.

placed design, manufacturing, and marketing people on the same team. Even so, there were many starts and stops in the initial stages due to disagreements over styling. Moreover, numerous changes in engineering specifications were issued late in the design phase, and serious problems surfaced in the manufacturing system during the buildup to full production. Many of these complications could have been avoided if the team had been able to build more, and better, prototypes earlier in the process. But penny-foolish senior managers said no. Prototypes would have surfaced problems early and reduced the changes in engineering specifications. And production would have begun much more smoothly had full-system prototypes been made sooner so that the team could test the tooling. The first fully representative prototypes were delivered only 20 months before mass production was due to begin. In hindsight, the eventual delays cost the company much more than the prototypes would have. They hurt the product's profitability and, more important, they prevented Ford from learning how to integrate the design, marketing, and manufacturing functions. With the CTC process it now has in place, Ford is unlikely to experience such pitfalls again.

Contrast Ford's attitude in this project with Chaparral's. Chaparral had a loss in one particular poor year that happened to equal the amount it had spent on development projects that year. Chaparral executives could have taken the view that if the company hadn't pursued the development projects, it would have broken even. But Chaparral managers knew that if they wanted to attain the competitive position they sought two years down the road, they had to pursue projects now that would expand the company's capabilities. So they justified the projects on a strategic basis, not a financial one.

Another common management foible that the Manufacturing Vision Group spotted was a tendency to establish some kind of "learning SWAT team." The problem with this approach is it can make employees look at learning as "that group's job, not mine."

Senior managers often try to take another shortcut. They assign someone else to figure out what was learned from Project X and how to apply it to Project Y. The trouble is, that approach sends the message that management doesn't place a premium on learning. In the companies that most effectively utilize development projects to expand their capabilities, senior managers strive to be leaders in learning. They know they must learn firsthand about the detailed workings of the company before they can help others do the same. They believe that they cannot delegate this responsibility because it requires knowledge of the entire corporation and an understanding of how a change in one area affects other areas.

Still another common failing among companies is the lack of a reward system that adequately encourages learning and project leadership. At most companies, employees are rewarded for concrete results, not for learning. And few career paths encourage managers to take on project leadership. An important part of the job of a project leader is to push the team and the company to change. Since most people resist change, project leaders often end up with a lot of arrows in their backs. It's no coincidence that project leaders who are effective in project after project tend to be those who have the visible support of senior managers.

Development projects are the place to start changing the priorities and goals of all employees, to create a corporate environment in which line operators, managers, and executives continually seek to advance their own knowledge and that of the whole company. These projects are invaluable catalysts for cultivating managers who can be leaders in learning. But this requires a certain mind-set. Meetings to review proposals for new development projects will no longer be dominated only by issues about product concept, market plans, budgets, and the like. Senior managers will also ask a project's advocates to outline the learning objectives. "What lessons learned in previous projects can we apply to this one?" they will inquire. "What new management or engineering processes will we test? What new organization or team structures will we develop? What new skills will employees learn? What new capabilities will the company gain? And, equally important, do we have core capabilities that have outlived their usefulness, that might prevent the project from achieving its goals?"

The last question in particular is asked all too rarely. Many managers presume that core capabilities are eternal. They fail to recognize that even a capability that has been a pillar of a company's success for decades can become a liability unless the company constantly tests and shapes it.

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