CASE STUDY 5.2

California's High-Speed Rail Project

With the announcement that California would be committing $4.3 billion to the construction of a 29-mile rail link between the cities of Fresno and Madera in the state's Central Valley, California's 20-year-old quest for a high-speed rail line was finally coming true. The California High-Speed Rail Authority (CHSRA), first established in the mid-1990s, had long pursued the goal of linking the San Francisco Bay metropolitan area in the north to the cities of Los Angeles and San Diego in the south. Under the administration of President Obama, the federal government set aside money from a stimulus package to fund high-speed rail initiatives in several states, including Wisconsin, Florida, Ohio, Illinois, and California. The election of Republican governors in Ohio and Wisconsin led to a rethinking of the projects in those states, and they ultimately refused the seed money grants from Washington, harboring suspicions that the rail projects were both unnecessary and likely to be subject to huge cost overruns, for which state taxpayers eventually would be held responsible. As a result, Transportation Secretary Ray LaHood reclaimed $1.2 billion from these states to be presented to 13 other states.

One of the states that stood to benefit most from this redistribution of federal money was California, with its ambitious and, as many argue, ultimately foolhardy decision to support a massive transportation project to link its cities with high-speed rail. The history of the CHSRA's drive to create high-speed railways is a fascinating one, with supporters and critics in equal measure. As part of its initial pitch for the project, the CHSRA argued that the system would lead to multiple benefits. For a one-way $55 ticket, passengers in Los Angeles would be able to travel to the Bay Area in less than 3 hours or reach San Diego in 80 minutes. Estimating that 94 million passengers would use the rail system each year and that its development would generate hundreds of thousands of permanent jobs, the CHSRA used these projections to help convince state voters to approve a nearly $10 billion bond issue and support the project in a 2008 referendum. Other advantages the organization cited included the reduction of pollution and fossil fuel use by diverting millions of people to the rail line who otherwise would use automobile or air travel between cities.

With a revised estimated cost of at least $69 billion, the overall project would first operate trains up to 220 mph along a 520-mile route between Anaheim and San Francisco. Extensions to San Diego and Sacramento would be built later. The Obama Administration approved a total of $3.18 billion in federal funding for the state's bullet train proposal, the largest amount for any pending rail project in the nation. With matching state funds, the amount available for construction was about $5.5 billion, according to the CHSRA.

Since its approval, a number of events have led insiders to reconsider the wisdom of pursuing the rail project. First, based on other high-speed rail projects, the CHSRA has revised its projections for ridership downward, suggesting that the project will serve 39 million passengers by its tenth year of operation, which is about 40% of its original estimate prior to getting funding approval. Second, another change in the original business model is that projected ticket prices have been raised to $105 for a one-way trip, although critics suggest that actual prices, based on comparable cost-per-mile data from Europe and Japan, are likely to be closer to $190 (the CHSRA's current projections are that tickets will sell for $86). A third concern relates to the decision to start the project with a link through largely empty agricultural farmland between two Central Valley communities; that is, though the high-speed rail project is specifically designed to join major metropolitan areas such as San Francisco and Los Angeles, the first pilot stage is to be constructed along a route that is one of the lesser-populated segments of the line. This decision sits poorly not only with rail critics but also with rail supporters, who recognize the need to make a more significant statement in order to answer

other objections of critics. "It defies logic and common sense to have the train start and stop in remote areas that have no hope of attaining the ridership needed to justify the cost of the project," U.S. Representative Dennis Cardoza (D-CA) wrote in a letter to Transportation Secretary Ray LaHood.

A fourth closely questioned element in the project is the projected final price. Though the CHSRA and state officials hold to the latest $69 billion price tag (a figure that has doubled since the original $33 billion estimate approved by voters in 2008), others, including the transportation consultants at Infrastructure Management Group, have suggested that this figure, based on historical data, grossly underestimates the final cost while inflating the likely number of passengers. Economists suggest that a more likely range for the final cost of the project would be anywhere from $100 to $250 billion, and a more reasonable estimate of annual passenger traffic is in the range of 5 million. If these numbers are close to accurate (and they are disputed by the CHSRA), they point to a project that cannot ever hope to pay for itself, will require long-term annual subsidies, and will place the already cash-strapped state even deeper into a financial hole. "The train will lose money and require a subsidy," said Joseph Vranich, former president of the national High-Speed Rail Association. "I have not seen a single number that has come out of the California high-speed rail organization that is credible. As a high-speed rail advocate, I am steamed."

Developing the current section of the project, 118 miles through the relatively easy terrain of the Central Valley, has been a worrisome lesson. The expected cost of this stretch was $6.4 billion, a number that by 2017 had inflated to over $10 billion. Furthermore, a federal risk analysis study noted several obvious problems: 1) In 2012 the rail authority said it would start construction in Fresno, but had not yet purchased a single parcel of land, 2) Farmers resisted from the beginning, unwilling to sell their land—some of the most fertile in the state—to support the project, 3) Actual construction started two years late, in 2014, 4) By 2016, the rail authority expected to have acquired 100% of the land needed to support the rail line. In fact, 25% of the land has still not been acquired for just the first 29-mile stretch between Madera and Fresno, and less than half of the total land in the Central Valley has been purchased. Current estimates suggest that land purchases will not be completed until 2019 at the earliest.

A recent study by three economists found the CHSRA business model to be deeply flawed, concluding that it relies too heavily on federal grants and does not adequately address risks posed by fluctuating ticket prices. "When an investor looks at an assertion by the CHSRA that says you're going to earn an operating surplus of $370 million in the first year of operations and $1.5 billion profit by the third year, they shake their heads and smile," said William Grindley, a former World Bank analyst. "It doesn't pass the smell test." This new study calls the CHSRA's revenue estimates "unreasonably optimistic" and is confirmed by a 2013 Reason Foundation study suggesting that the CHSRA could require over $350 million in annual subsidies to stay in business. One key to attaining sustainability, for example, is the CHRSA's ability to secure billions of dollars in additional funding from the federal government. The CHSRA acknowledges that the project hinges on additional funding coming from the federal government, but believes that making a good faith effort to produce a workable rail network is critical for securing additional money. However, after the recent national elections, officials in both the Trump administration and Congress have made it clear that there will be no more federal dollars available to support the project.

Recent court decisions have put the brakes on the project as well. The California 3rd District Court ruled that the state could not continue to sell bonds supporting the project since the CHSRA had failed to comply with its own guidelines regarding funding. Voters were originally told that state financial exposure would be limited and that the federal government and private investors would put up most of the money—promises that so far have failed to materialize. Washington has committed only a few billion dollars, and there is absolutely nothing else the state can expect from the federal government to support the project. The court ruled that the state's attempt to sell $6.8 billion in bonds to fund the project violated the original provisions of the 2008 referendum. Jerry Brown, California's governor, has vowed to continue the court battle as long as it takes to get the bonds approved. However, in the meantime the project is stalled for lack of funding to continue building the first 29-mile stretch of track. The project also faces a ticking clock, because if the federal grant money is not used by a specific date, it will be reclaimed by Washington.

As of now, one could argue that the project's future is simply a debate between "dueling economists." However, there is no question that the future of California's high-speed rail is uncertain. By 2016, eight years after the project was approved, not one penny in private money had been secured to support the project and California's idea of using money from their "cap-and-trade" auctions to support the project has been a disaster, with far lower revenues raised than the state had hoped to receive. Will the outcome be a case of the best intentions meeting economic realities? Only time will tell.[34]

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Questions

1. Assess the benefits and drawbacks of the high-speed rail project. In your opinion, do benefits outweigh drawbacks, or vice versa? Why? Justify your answer.
2. What are the implications of starting a project based on tenuous projections that may or may not come true 10 years from now?
3. Could you justify the California high-speed rail project from the perspective of a massive public works initiative? In other words, what other factors enter into the decision of whether to pursue a high-speed rail project? Why are they important?

CASE STUDY 5.3

Project Management at Dotcom.com

Dotcom.com, a software engineering and systems development consulting firm, sells a wide assortment of Internet- and computer-based solutions for resource planning, administrative, and accounting networks to organizations in health care delivery, financial services, and hotel management. Typically, a service provider approaches Dotcom.com with a list of problems it has and some targets for organizational improvement. Because most of Dotcom's clients are not themselves computer savvy, they tend to rely heavily on Dotcom to correctly diagnose their difficulties, propose solutions to correct these problems, and implement the new technologies. The industry in which Dotcom operates is extremely competitive, forcing successful organizations to make low bids to win consulting contracts. In this environment, project management is vital for Dotcom's success because poorly managed projects quickly eat up the profit margin for any job.

Unfortunately, Dotcom's senior management team has noticed a recent upsurge in project operating costs, and a related drop-off in profitability. In particular, Dotcom's executives are concerned because the last seven consulting contracts have resulted in almost no profit margin because the software systems were delivered late and required several rounds of rework to fix bugs or correct significant shortcomings in the software. The firm decided to hold a weekend off-site retreat with the project managers responsible for these most recently completed projects in order to learn why project management was being done so poorly.

To a person, the project managers fixed the blame for their problems on the clients. A typical response was made by Susan Kiley, a project manager with more than five years' experience, who stated, "We are put in a very tough position here. Most of the customers don't know what they really want, so we have to spend hours working with them to get a reasonable Statement of Work that we can develop the project scope around. This takes time. In fact, the more time I spend with the customer up front, the less I have to get my team to actually develop the system for them. It's a Catch-22—if I want to get things right, I have to pry information out of them. The better I do getting a sense of their problems, the less time I have to develop and run the project!"

Jim Crenshaw, another project manager, spoke up. "It doesn't stop there, unfortunately. My biggest problems are always on the back end of the project. We work like dogs to get a system up that corresponds to the client's demands, only to have them look it over, push a few buttons, and start telling us that it is not anything like what they had in mind! How am I supposed to develop a system to solve their problems when they don't know what their problems are? Better yet, what do we do when they 'think' they know what they want and then when we create it, they turn around and reject our solutions out of hand?"

After two hours of hearing similar messages from the other project managers, it became clear to the senior management team that these project management problems were not isolated, but were becoming embedded in the firm's operations. Clearly, something had to be done about their processes.

Questions

1. How would you begin redesigning Dotcom.com's project management processes to minimize the problems it is experiencing with poor scope management?
2. How do the company's consulting clients contribute to the problems with expanding or changing scope? If you were to hold a meeting with a potential customer, what message would you want the customer to clearly understand?

3. How do you balance the need to involve clients with the equally important need to freeze project scope in order to complete the project in a timely fashion?
4. Why are configuration management and project change control so difficult to perform in the midst of complex software development projects, such as those undertaken by Dotcom.com?

CASE STUDY 5.4

The Expeditionary Fighting Vehicle

In 2011, one of the most complex and difficult congressional budget decisions in years finally determined the fate of the Marine Corps' Expeditionary Fighting Vehicle (EFV). Given the numerous delays, tests, conditional approvals, and retests, the EFV had been no stranger to controversy. Although the EFV was loudly defended by senior officers in the Pentagon, a growing army of critics cited the vehicle's poor test performance, and costs continued to balloon. As one reporter noted, "After 10 years and $1.7 billion, this is what the Marine Corps got for its investment in a new amphibious vehicle: a craft that breaks down about an average of once every 4.5 hours, leaks, and sometimes veers off course." The biggest question is, how did things get to that point with what was viewed for many years as one of the Marine Corps' highest priority acquisition programs?

The EFV program began more than 20 years ago when this armored amphibious vehicle was designed to replace the 1970s-era Amphibious Assault Vehicle. The purpose of vehicles such as the EFV is to provide armored support for the early stages of amphibious assault onto enemy shores. The EFV was designed to roll off a Navy assault ship, move under its own power at 20 mph on the water's surface for distances up to 25 miles while transporting a Marine rifle squad (up to 17 Marines), cross hostile beaches, and operate on shore. The EFV was moderately armored and carried a 30-mm cannon in a turret for offensive firepower. The EFV often was described as a Marine Corps variant of the Bradley Fighting Vehicle.

The EFV began as a state-of-the-art acquisition program for the Department of Defense (DoD). Following a concept exploration phase to determine the viability of the project that began in 1988, the project entered a program definition and risk reduction phase during which it was considered "a model defense acquisition program," winning two DoD awards for successful cost and technology management. The original contract was awarded to General Dynamics Corporation in June 1996 for full engineering and design work, and that corporation was awarded a subsequent contract for the system development and demonstration (SDD) phase of the program in July 2001. It is during this critical stage that all the complex engineering, systems development, and functionality of the program must be successfully demonstrated. Perhaps unwisely, General Dynamics budgeted only 27 months for total testing and system verification.

This far-too-ambitious schedule soon became a problem for General Dynamics and the EFV, as a series of technical problems began to surface. Two additional years were added to the SDD phase as it became apparent that the EFV concept was beset with numerous unforeseen problems. In December 2004, tests of EFV prototypes demonstrated further problems. The tests showed severe failure in the vehicle's main computer system, causing the vehicle's steering to freeze. The hydraulic systems powering the vehicle's bow-flap, installed to make the EFV more seaworthy, began leaking and failing. The EFV was originally intended to operate for an average of 70 hours between mission failure breakdowns, but because of the numerous reliability problems the Marines reduced this figure to 43.5 hours. Following these prototype tests, an additional two years were added to the program development schedule.

The year 2006 was not a good one for the Expeditionary Fighting Vehicle. The EFV was put through a critical operational assessment, a series of tests to demonstrate that it could meet performance requirements and was ready for production. The EFV performed abysmally, experiencing numerous system failures, breakdowns, and failure in its reliability assessment. During the tests, the vehicles were able to operate on average for only 4.5 hours between breakdowns, and it took nearly 3.5 hours of corrective maintenance for every hour of operation. Poor reliability resulted in 117 mission failures and 645 acts of unscheduled maintenance during the tests. The EFV's reliability was so poor that it successfully completed only 2 of 11 attempted amphibious tests, 1 of 10 gunnery tests, and none of the 3 land mobility tests. Other problems included the fact that the prototypes were nearly one ton overweight, suffered from limited visibility, and were so noisy that the driver was advised to wear ear plugs while in the driver's chair, despite the fact that

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doing so would make it nearly impossible to communicate with the EFV's commander. In fact, so poorly did the EFV fare during the operational assessment that the Marines announced they were going back to the drawing board with the design, aiming to complete a new SDD phase by 2011, eight years behind the original schedule.

Meanwhile, the program's costs just kept rising. When the EFV was first conceived, the Marines planned to purchase 1,025 of them at a total cost of $8.5 billion. Subsequently, a DoD estimate put the program's cost at upward of $14 billion dollars, while the Marines had trimmed their order to 573 vehicles. In effect, even assuming those final figures were to hold, the cost of the EFV had risen from $8.3 million per vehicle to slightly more than $23 million. Overall, the Pentagon estimated it had spent $2.9 billion on the program in R&D and testing costs before buying a single vehicle.

Wrong Weapon for the Wrong War?

The ongoing litany of failures associated with the EFV's development gave rise to some more fundamental questions about the purpose behind developing the vehicle. Critics argued that the EFV simply did not serve a meaningful role in the modern Marine Corps' mission. Among their concerns were the following points:

- Modern warfare does not offer options for "storming the beaches," as the old Marine Corps model envisions. Low-level, regional, or urban conflicts make the need for amphibious assault an anachronism in the modern day. As Laura Peterson, a defense analyst with Taxpayers for Common Sense, suggested, "This thing isn't just fighting the last war, it's fighting last century's wars."
- The advance in cruise missile technology makes the "25 mile offshore" model obsolete. When the EFV was envisioned, it was believed that the Navy could protect its ships by remaining just over the horizon, disembarking EFVs from that distance to assault enemy shores. Critics contended that new cruise missiles have a range of over 100 miles, making the EFVs or the Navy's ships vulnerable to attack if they were to follow the original model.
- The flat bottom of the EFV, necessary for ship-to-shore transportation, makes them extremely vulnerable to the shaped charges from improvised explosive devices (IEDs), used so effectively in Iraq and Afghanistan. General Dynamics argued that redesigning the bottom of the vehicle would alter its amphibious characteristics.

A number of senior Pentagon officials, including the Commandant of the Marine Corps, stood by the EFV, arguing that the Marine's "expeditionary" mission will remain alive and in effect into the foreseeable future. The EFV, they believed, was a critical element in the deployment and striking capability of the Marines. However, other high-ranking government officials, including the Secretary of Defense, gave only tepid and qualified support for the continued development and deployment of the EFV.

Final rounds of funding began to limit additional money for the EFV and to tie continued support to the ability of General Dynamics and the Marines to demonstrate much improved reliability and overall system effectiveness. For example, in 2010 the Senate Appropriations Committee authorized $38 million for one more round of tests and set aside $184 million to shut the program down in the event the vehicle failed the tests again. The axe finally fell at the start of 2011, when Secretary Gates sent his preliminary budget to Congress. Among the casualties of the cost-cutting knife was the EFV program. The program had long been teetering on the brink, so in a world of smaller Pentagon budgets and more aggressive program oversight, perhaps it was inevitable that the EFV would finally slip over the edge.[35]

Questions

1. What does the story of the EFV suggest about the importance of considering what a project's key mission is supposed to be prior to authorizing it?
2. The EFV has been labeled, "The wrong weapon for the wrong war at the wrong time." Do you agree or disagree with this characterization? Why?
3. Why does the EFV failure illustrate the dangers of long lead-times for weapon systems? In other words, when a project's development cycle takes 20 years from start to finish, what dangers do the project developers face when the project is finally operational?