

Leadership implications in complex projects: The Boeing Dreamliner and Jim McNerney¹

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Organizational Ergonomics

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In defense of criticism of Boeing's 787 production delays, CEO Jim McNerney explained:

We are trying to come up with the strongest set of partnerships we can with the people that supply our major systems and structures. In defense, we are trying to respond to the pressures of governments buying fewer things at lower prices, with less favorable contract terms. And that pressure cannot just stop at Boeing. We have to find willing partners [to share the burden]. And on the commercial side, low-cost carriers and a very flattish global economy leads you to the same conclusion. So the 'no-fly list' is people who don't want to play ball, who only want to hide behind the contractual language of their current programs. We're going to give those who do want to work with us more business—or we'll move some things in-house. This is a not a rape, pillage and plunder exercise. This is the reality we all face. The majority of [suppliers] are beginning to have productive discussions with us. We have some holdouts, people who take the position that the pressure should only be absorbed by Boeing, notwithstanding the fact that 65 percent of most of our airplanes are built by suppliers...we both have to demand lots of productivity [improvements] to offset price pressure. Those that work with us in that way will find more volume. We are the biggest player. My message is, 'Don't bet against us.'

The Boeing Dreamliner

Boeing Corporation was one of the world's largest manufacturers of commercial aircraft, ranking 27th on the Fortune 500 list in 2016. When it announced the delivery of its first 787 Dreamliner transporter to its first customer, All Nippon Airways, in September, 2011, it was almost 40 months later than originally planned, after a long series of unexpected delays. The actual development cost of the project had been estimated at about US\$40 billion but came in over twice the original estimate. One year later, a malfunction was discovered in one of the aircraft's lithium batteries, which caught fire after takeoff. These problems led to months of grounding, imposed by the FAA (Federal Aviation Administration), of the entire Dreamliner fleet already in service.

The Dreamliner was designed to be a revolutionary project in terms of physical characteristics, technology, management style, financing, design and engineering management, quality assurance, and assembly processes. Many of these initiatives were intentionally taken on to benefit from new developments in aviation technology and to speed up design and development; however, they posed unexpected challenges for both the company and the project team.

¹ This case is based on Shenhar, A.J., V. Holzmann, B. Melamed & Y. Zhao. (2016). The challenge of innovation in highly complex projects: What can we learn from Boeing's Dreamliner experience? *Project Management Journal*, Vol. 47, No. 2; 62-78.

A New Organizational Paradigm

Boeing adopted a new organizational paradigm for the development of Dreamliner and decided to outsource an unprecedented portion of the design, engineering, manufacturing, and production to a global network of 700 local and foreign suppliers. With more than 70% foreign development content, this decision turned Boeing's traditional supply chain into a development chain. Tier-1 suppliers became responsible for the detailed design and manufacturing of 11 major subassemblies, while Boeing only did system integration and final assembly. Figure 1 lists the project's major subassemblies and their tier-1 suppliers.

Furthermore, Boeing came up with a new risk and revenue sharing contract with its suppliers, called the “build-to-performance” model (as differentiated from the more typical “build-to-spec” or “build-to-print” models). According to the model, contract suppliers bore the non-recurring R&D cost up-front, owned the intellectual property of their design, and got paid a share of the revenues from future aircraft sales. Table 1 summarizes the main features of this model. Under this model, the suppliers’ roles were dramatically changed from mere subcontractors to strategic partners who had a long-term stake in the project. This model created some risks, which caused extensive integration problems and additional delays.

Finally, Boeing employed a new assembly method. Subcontractors were required to integrate their own subsystems and send their preassembled subsystems to a single final assembly site. The goal was to reduce Boeing's integration effort by leveraging subcontractors to do more work compared with previous projects. However, many of these subcontractors were not able to meet their delivery schedules due to lack of experience in subsystem design and integration, as well as insufficient guidelines and training. As a consequence, parts and assemblies, which were sent to Boeing for integration, were missing the appropriate documentation, including instructions for final assembly.

Unanticipated Consequences

Supply chain and design delays increased, as did Boeing’s financial losses, including penalties for late delivery of the aircraft. CEO McNerney had to face some hard facts based on earlier decisions. He acknowledged that his new paradigm may have been flawed, “We got a little bit seduced that it would all come together seamlessly and the same design rules would be applied everywhere in the world and corners wouldn’t be cut and financial realities wouldn’t hit certain folks.”ⁱⁱ

McNerney’s approach to workers, suppliers, and labor resources was notably off-putting, according to many in Washington State, Boeing’s corporate home. Since 2011 when Boeing opened its non-unionized South Carolina assembly plant where salaries were approximately \$10/hour less than those of the unionized workers in Washington Stateⁱⁱⁱ, worker relationships have been troubled. While admirers have touted his efficiency and ability to deliver profits, alienated professionals at every level, along with union members, have described McNerney as “cold-blooded.” One labor specialist stated, “A lot of employees feel top management doesn’t value them, treats them as expendable...[creating an atmosphere of] lowered trust, anger and disgruntlement.”^{iv} According to Richard Aboulafia, noted aerospace specialist,

“Management believes if it continues to squeeze suppliers and labor, the problem[s] will be solved. Again, the track record here is not great. Most of the manufacturing world tell a very different story. Whether it’s with cars, aircraft or turbines, productivity improvements often

come from the shop floor. That means convincing the people who build things to identify ways to reduce scrap, improve work flow and eliminate defects. To promote the kind of process improvements that happen in the factory, a work force needs incentives such as profit-sharing or other compensation. At the very least, machinists and engineers need to believe their work is valued. Taking away pensions at a time of record sales is simply a bad way to motivate workers to go the extra mile. Boeing right now embodies a strange combination of very good and very bad.”^v

McNerney’s management style created its own problems. He vacillated between maintaining his dispassionate, hands-off general management style with multiple-times per day meetings with executives during the Dreamliner grounding crisis. His revolving door policy for managers in charge of the 787 project (four in as many years)^{vi} generated a sense of uncertainty at all levels in the company and increased pressure to meet goals quickly. This focus on urgency caused him to reflect, after having resolved the major problems in the Dreamliner, that the plane could have been completed sooner had Boeing listened more to the customer and less to innovative technology. He said, in a rare interview in 2014, “What I would like to have done is pursued 70 percent of the technology that still would have satisfied 95 percent of [customer desire]. It would have gotten to them quicker, and it would have cost us less...You get excited about these projects, and things creep into the design and you lose discipline sometimes. We just need to be reminded about that.”^{vii}

As described by an anonymous former Boeing executive, “The sense I always got from him in meetings is that it could have been any business...If we’d been making cameras or autos or doing bond trading, it would have all been the same to him. The net effect is distancing from the people who come to work there every day, who bring their hearts and souls to it and want to make it more than a job.”^{viii}

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ⁱ Anselmo, *et al.* (6/17/2013). Don't bet against us.

ⁱⁱ Ostrower, J. and J.S. Lublin. (1/24/2013). The two men behind the 787.

ⁱⁱⁱ Wilhellm, S. (4/8/2015). Boeing's South Carolina workers make \$10 per hour less than those in Everett.

^{iv} Gates, D. (12/1/2014) Boeing boss Jim McNerney's turbulent tenure.

^v Aboulafia R. (3/9/2015). Boeing should not lean on labor to cover 787 losses.

^{vi} Hymowitz, C., T. Black. (1/18/2013). It's not his mess, just his to clean up.

^{vii} Anselmo, J.C. and G. Warwick. (7/14/2014). 'Not backing off.'

^{viii} Gates, *op cit.*

Figure 1: 787 Project's Tier-1 Suppliers

