# Don't Let a Mistake go to Waste:
# Applying Lessons Learned From SpaceX

If you were awake (relatively) early on Saturday, November 17, 2023, you might have seen the launch of SpaceX's Starship with its Super Heavy first stage rocket that had 33 engines. The test launch of their first unmanned Starship ended in the rocket self-destructing – a *"rapid unscheduled disassembly"* they called it – when its engines stopped and the rocket spun out of control.

The liftoff on Saturday was incredible - click to view. (It has a bit of a long intro – go to 38:40 for the final countdown and launch.)  One could not help but be in thrall of the all the brilliant people – rocket scientists and engineers – that made it possible. While this second test launch didn't get to the hoped-for conclusion, it did accomplish several key goals.

In the first 10 minutes post-launch, the first stage blew up and the Starship capsule lost communication with the ground stations. But don't call it a failure. SpaceX's position was: *"success comes from what we learn, and we learned a tremendous amount."*

In watching the November 17 stream, the SpaceX commentators made statements like:
- *"The longer we fly, the more data we collect."*
- *"Fail fast and learn even faster."*
- *"All the data we collect will be helpful in making improvements."*
- *"We're going to take all the data and make things better."*

All of that might be easy for SpaceX which is owned by the world's richest person, Elon Musk, but we can also make use of the underlying concept: As long as we can learn something, we don't have a true failure.

And they did learn something: Another Super Heavy was launched on March 14, 2024. This time the craft successfully executed several critical maneuvers, demonstrated important functionality, and lasted approximately 49 minutes (40 minutes longer than the previous test flight) before all telemetry signals were lost. On their website, SpaceX said, "Recursive improvement is essential as we work to build a fully reusable transportation system…". In other words, you try, learn, improve, and try again.

This idea of learning from experiences can be viewed through the lens of knowledge management, a topic of high interest these days in pharma and biopharma. The ICH Q10 Pharmaceutical Quality System guideline (Q10) identifies Knowledge Management, along with Quality Risk Management (QRM, Q9(R1)) as foundations of a modern pharma quality system. While there is some variation, the knowledge management model includes generation, use, storage, transfer, reuse, and archiving. Lessons learned involves all of these phases.

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Using a simple, structured approach to learning from an event doesn't just need to happen after an undesired outcome; we should also use this when things go superbly. Why? We want to identify what contributed to the success in achieving the goal so we can do it again, even better next time. One way to perform a lesson learned exercise would be to follow the approach used by military organizations and written about by David Garvin from Harvard University. Garvin suggests using this set of questions:

- What was supposed to happen?   What was planned?
- What actually did happen?  What were the results?
- Was there a difference between what was planned and the actual results?  Why?  Why not?
- What can we learn from this?  What do we want to continue/sustain?  What should we do differently next time?

An even simpler approach is to ask, "what did we learn today (or this week or this year)?" At a recent meeting of ValSource consultants (sometimes referred to as "Concordia-ValSource") the participants identified what things they learned in 2023.  These included:

- It's important (as a consultant) to be adaptable to better navigate different styles and cultures of clients.
- Relationship building and trust is as important as expertise.
- Share "bad news" early.
- Building relationships involves effective communication.
- Consulting requires listening critically to the client to come up with creative, compliant solutions.
- Use your time constructively – building an industry presence and for self-development – when you are "on the bench" or not actively working on a client project.
- Look for ways to leverage the knowledge and skills of other ValSource colleagues in your project or assignment.

This information can become the basis for an action plan to address these learnings: making changes to systems, procedures, practices, and behaviors.  This creates value from what otherwise might be a loss.

So, before you close the books on a project or head home for the day, ask yourself, "What did I learn today and how will that make tomorrow better?"

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