

LEARN FROM NEW PRODUCT FAILURES

Postmortems conducted in teaching hospitals can help companies profitably gain from the pain of their new product failures.

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OVERVIEW: *Many companies do not learn from their new product mistakes. Consequently, the mistakes are repeated, wasting millions, even billions, of R&D and marketing dollars every year. Product development success would be higher and far less risky if companies would regularly analyze, widely share, and learn from each unsuccessful new venture. The positive effect of formal post-launch reviews on the top and bottom lines is often impressive. Post-launch reviews in companies we studied often improved the new product success ratio from 30 to 50 percent. This article describes the needed culture, process and steps to conduct post-launch reviews from new product failures that closely parallels the methodology teaching hospitals use to learn from their mistakes.*

KEY CONCEPTS: *post-launch reviews, new product failures, learning organizations, best practices.*

Deliver me from the person who never makes a mistake and also from the person who makes the same mistake twice.—William J. Mayo, M.D. co-founder, Mayo Clinic.

Twice a month in teaching hospitals around the world, 100–200 people stream into auditoriums with the objective of extracting success from failure. These meetings,

called Morbidity and Mortality Conferences (or simply M&Ms), have been the foundation on which the medical world learns from its mistakes. Physicians regularly gather behind closed doors to review unexpected patient outcomes and deaths that occurred on their watch, determine what went wrong, and figure out what to do differently next time. This is the one place where physicians can talk candidly about their mistakes in a legally protected environment.

The century-old practice of conducting hospital M&M conferences began in the early 1900s by Dr. Ernest Codman at Massachusetts General Hospital, and is now required for teaching hospital accreditation in the United States. It is a systematic approach that utilizes the patient's history, symptoms, diagnostic images, pathology tests, autopsy results, prescribed treatments, and other information to search for the root cause(s) results of an adverse patient outcome. It is like a detective story in which a medical resident reports out in a non-threatening, closed hospital forum what occurred and what should have been done differently or better for the patient. By reviewing complications and deaths, M&Ms help the entire multidisciplinary team learn from their mistakes and supply needed corrective actions.

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M&M conferences model the professional leadership, safe culture and processes needed for manufacturers to routinely learn from failed new product launches. Why don't bright, highly educated people in R&D, engineering organizations and business units regularly learn from their new product development mistakes as teaching hospitals routinely do? Unfortunately, there are too many companies that lack a safe culture, objective analysis and a proven methodology to analyze and discuss the lessons learned and translate them into better new product decisions (1).

Don't Learn from Pain

Most of the roughly 50 CEOs, CTOs, general managers, engineering, and marketing managers whom we talked with said they should, but never do, objectively learn from their new product failures. Some of the reasons for not conducting postmortems that we heard frequently from managers included:

1. *"We have time pressures and oppressive workloads."* The need to get on with the next project as soon as one project is over dominated the reasons we heard. Learning organizations, however, will find or make the time to learn from their mistakes.
2. *"What's the value of looking backward?"* Some companies believe little is learned from 20/20 hindsight by objectively looking at their mistakes. Many claim they know the causes from informal discussions and Monday-morning quarterbacking. These are often the same companies where finger-pointing and blame occur.
3. *"We don't have a budget, people or resources."* The daily pressure for improved bottom-line results with the same or fewer people is often behind this excuse. But when you consider the costs when a challenging project fails after the launch, an objective analysis would be an insignificant additional investment, not a cost. Learning organizations will allocate the funds to analyze their new product failures.
4. *"The root problems are too complex."* Products and customers' requirements are becoming more complex, but this is still an excuse. Most R&D project failures are rarely caused by a single error. Errors are often a combination of individual, team and systemic deficiencies. Most medical M&M cases are certainly as technical and complex as any unsuccessful new product project.
5. *"We don't know how to conduct a postmortem review."* This is probably the most understandable reason. This article describes the needed culture, leadership and processes to select and objectively review failed new products, identify the root causes, and make recommendations for going forward.

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All these reasons reminded us of the saying, "If we only looked back through hindsight, we could avoid a lot of future big mistakes."

Learn from Your Product Failures

Successful new products typically have many parents while failures are often orphans. Discussing new product success is easier than openly talking about mistakes. Typically, considerable euphoria surrounds a successful new product because victory-sharing is far less painful than admitting and learning from errors. Sensitive topics and systematic deficiencies are unfortunately not always addressed at new product reviews or after the launch. James Dyson, the founder and chairman of the Dyson vacuum cleaner company, firmly believes design engineers learn more from failure than success. Dyson stated:

An engineer's life is 99 percent failure. You don't learn much from success and your successes are few and far between. An innovative engineer goes to work each day excited because you know there are hundreds of problems that you have not solved. Failure is actually like a drug that keeps you living on the edge and trying to come up with the right solution.

Intuit's co-founder Scott Cook told us:

The root causes of success are usually not raised or known. I don't think there is as much deep reflective thinking, soul searching, and rigor around successes as there is with an objective postmortem. Even though Toyota has had many successes, we learned that they spend much more time determining what they could have done better. When visiting Toyota, you will realize there is never a perfect new product launch at the company.

An objective post-launch review or postmortem replaces hunches and finger-pointing with an open discussion of what happened and what to do differently next time. Even when reviewing a successful new product, people should regularly ask what went well, what went poorly,

what needs improvement, and how they might create an even greater success next time.

Buried Answers from Autopsies

In today's high-tech medical world, the autopsy, like a post-launch review, still provides a uniquely effective means of evaluating decisions and exposing poor judgments and bad habits (2). Physicians and design engineers can miss important factors. Without autopsies, physicians and product development people don't know when they have missed something fatal and so are likely to repeat the mistake. In short, they miss the chance to learn from their and others' professional mistakes. Instead, they bury answers to honest and sometimes careless mistakes. As Dr. Michael Gillette, a senior anesthesiologist at Carolinas Medical Center, told us:

If you want to reduce errors or improve your success rate, start by evaluating the cases where you're not sure why you lost them with an autopsy performed by an objective person who was not part of the attending team.

The hospital autopsy report is always part of the evidence presented at an M&M conference that involves a fatal outcome. A team of qualified resident physicians not involved with the adverse outcome conducts the M&M analysis, presentation and recommendations. In companies, this must be done by a highly competent and objective post-launch review team that was not in any way associated with the failed project.

Post-Launch Review Teams

After choosing failed new products for review, an objective investigative team of two to three people must be selected for each project. Members of each investigative team include the principal investigator and the appropriate technical expert(s). The seven essential requirements of the technical experts and especially the independent principal investigator conducting a new product post-mortem review are:

1. *Relevant experience*—many years of hands-on experience studying and participating in new product successes and failures help to ask the right questions, identify the symptoms, root causes, and then make practical recommendations.
2. *Objectivity*—the investigative team should have nothing to lose or gain by what was done wrong; the principal investigator must be an outsider neutral to the division, business group or the corporation—never a member of the off-track venture being studied.
3. *Customer-centric*—OEMs and end-use customers who tried samples or prototypes but were unhappy or did not buy again are always interviewed; experience working with customers helps to ask the right questions and create more of an outside-in view to the analysis and can sometimes re-establish a tarnished customer relationship.

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4. *Interviewing skills*—sharp face-to-face listening skills and diplomatically raising questions about sensitive negative outcomes are needed; observing body language, tone of voice, and asking relevant, probing questions in a non-threatening way are critical skills gained from years of new product development experience.

5. *Persistence*—in scheduling interviews and getting people to share documents and speak up about what actually happened in each project, it is necessary to repeatedly ask what happened, why it happened, and collect evidence in the form of emails, past presentations, technical data, and cost information.

6. *Root-cause analysis*—like a detective, a chronological timeline of events and decisions must be developed and root-cause analysis used to build a factual cause-and-effect case; this structure also helps concisely present each case for discussion.

7. *Organizational and communication skills*—the principal investigator must orchestrate the process of scheduling and facilitating the interviews, collecting all necessary information, putting evidence into an acceptable format, and effectively presenting the case and recommendations to a wide audience.

The investigative post-launch review team is no place for rookies or those with little or no new product and commercial development experience. There should also be professional respect and good people-chemistry among the qualified principal investigator, the technical expert(s), and the CTO, CEO or senior management who commissioned the study.

Corporate M&M Learning Conferences

There are many factors to consider when conducting an M&M-type conference for a company's new product postmortems (3). The key success factors include the selection of cases, an objective analysis of what happened, an open forum to discuss the outcome, recommending

Performing M&Ms at Intuit, 3M and Toyota

We found excellent examples of regularly learning from failures that formally and informally followed the M&M process at three notable organic-growth corporations: Intuit, 3M and Toyota.

Intuit, the software company that developed Quicken, QuickBooks and TurboTax, has grown mostly by internal ventures or organic growth. Scott Cook, the company's co-founder, regularly encourages everyone to speak up about new product glitches during and after each project.

Intuit's software engineers spend a lot of front-end time observing and interviewing customers before freezing a design. Engineers are urged to voice their views firmly, especially about the customers' unstated needs, without fear of offending their colleagues, superiors or the CEO. Scott Cook encourages the design people to challenge anyone in the company by providing constructive innovation inputs, but to avoid personal attacks. He flattens an already flat organization by wandering around and telling everyone that it is okay to make new product development mistakes at Intuit if we all learn from them and do not repeat them.

All three of us interviewed Cook and others at Intuit and found regularly scheduled formal meetings and daily informal discussions of new product mistakes and near misses. Cook told us:

We have 8,000 pathologists who openly and safely speak about new product mistakes. They are failures only if we don't openly share and learn from the experience with no punitive actions and then do not repeat them.

Rick Jensen, Intuit's vice president of product development, added to Cook's statement:

Through an in-depth postmortem process, we recently documented numerous mistakes we made in launching a new product on a web-site that was a dismal failure. By debriefing the few customers that bought the financial planning software package and interviewing many that did not buy, we learned how shoddy our front-end work was. We're now trying again with the new knowledge from the mistake—a common process of how failure and near misses breed success in new product development at Intuit.

3M technologists openly discuss their problems and mistakes across departmental, divisional and group lines. The company has fostered a strong sense of attachment to the company as a whole at its annual Technical Forum. Every technical person is invited to this event, including people from all 3M's application and prototyping labs. Many divisions are invited to present their most recent technical or commercial challenges, with the hope that colleagues will help them find answers. The forum fosters trust, open dialogue, sharing, solving problems, and talking about failures.

Successful and unsuccessful projects, many resembling nightmares, are a major part of the discussions at each annual Technical Forum. The late Robert Adams, senior VP of R&D at 3M, sponsored the first Technical Forum and visited the nearby Mayo Clinic to adopt their M&M approach to learning from new product failures (4). At one of our new product workshops, Adams stated:

We learned how Mayo Clinic in nearby Rochester, Minnesota, regularly and safely reviews mistakes in their M&M meetings and shares the knowledge throughout the organization. The CEO, CTO and all senior executives must provide the internal protection for technologists

corrective approaches, and a leader or moderator who maintains a safe and constructive learning environment throughout the presentation and discussion of each case. Let's further describe the success factors for M&M conferences that have been effectively applied to learning from new product development failures in our own companies and others we interviewed.

1. Selection of cases to review

In the medical and corporate worlds, more reflection and deeper learning comes from the more challenging cases. These projects require significant risks, frequently fail before succeeding, and demand learning from mistakes. Dan DiMicco, a research metallurgist by training and the current chairman and CEO at innovative Nucor Steel, frequently quotes founder Ken Iverson:

If you're not failing you're not stretching yourself far enough. We owe a lot of our successes at Nucor to learning from project failures where we really stretched ourselves.

Dan DiMicco added,

Challenging failed projects that required a technical and commercial stretch and took people out of their comfort zone are prime candidates for postmortem reviews.

2. Regular reviews and recent cases

Most teaching hospitals have bimonthly two-hour M&M meetings where each adverse outcome case is discussed for 30–40 minutes. Two to four cases are discussed at each M&M conference. Intuit, a key participant in our study, regularly reviews failed or off-track projects at every operating division's monthly meeting. New product challenges

that exists for physicians at M&M meetings. A lot of our new product ideas get shelved, but people shouldn't ever fear for their jobs when that happens. The important thing is not to punish the people involved. Mistakes will always be made in developing new-to-the-world products. But if a person is essentially right, the mistakes he or she makes are not as serious as the mistakes management might make if it is so critical that it kills people's initiative. Long before the buzzword boundaryless organization was used, 3M never had structural boundaries and divisional charters like many other companies. It's perfectly okay to call someone anywhere in the company and offer help or ask for help on a technical or commercial problem. We have a long-time saying at 3M that "products belong to divisions, but sharing technology and application know-how belong to the entire company."

Toyota consistently develops reliable vehicles at lower cost and at greater profit than its competitors, while sustaining a steady flow of new products. Its new car and truck pipeline has resulted in consistent market share gains. Toyota, where acquisitions are a rarity, has been an organic growth machine for decades. Most senior executives are engineers who know how to build high-quality products. The foundation for Toyota's success is to continually learn from itself and others. The company believes in piloting everything first and assuming it won't get it right the first time. There is no failure, just deeper learning at Toyota, where learning is not separate from innovation.

Toyota's intense interest in being successful long into the future stems from its embrace of *hansei* (hahn-say), the Japanese word for reflection. The *hansei* method of learning from new product mistakes was explained to us by several Toyota executives:

Hansei is the rigorous review conducted after product development action has been taken and is a sobering reality check, regardless of a project's outcome. It's a stern and serious meeting, even after a success, to identify what went wrong throughout and at the end of every project. Its true meaning is closer to introspection than reflection, because it fosters real insight and learning. In engineering at Toyota, there can be no kaizen (continual improvement) without hansei. At Toyota, a hansei reflection meeting occurs at major milestone events (often to avoid near misses) and after each automobile is designed, made and launched. The reflection period is a "what went right and what went wrong" lessons learned event—with an emphasis on things that did not go well and then, as a team, developing an action plan to address the shortcomings.

Another Toyota executive told us that *hansei* is about reflecting on what did not go well, where, "You publicly feel bad and promise never to make the same mistake again." *Hansei* or self-reflection is a basic philosophy in the Japanese culture. Its meaning is to acknowledge your own mistakes and to pledge improvement.

Unlike in the Western world, where admitting your mistakes is often taken as a justification for penalty and serves as punitive evidence, Toyota managers told us that *hansei* could be translated to mean that acknowledgement is the first step to improvement. Furthermore, *hansei* new product meetings help avoid becoming complacent and arrogant by instilling a culture of humility, learning and improvement as an everyday activity. To stop *hansei* means to stop learning. With *hansei* one never becomes so convinced of one's superiority that there is no more room or need for further improvement. At Toyota, where everyone is seen as a knowledge worker, inventing and sharing new knowledge is not a special event, it is an expected way of behaving.—J. H., C. M., J. W.

and near misses are also a regular topic, high on the agenda, at Intuit's monthly senior leadership meeting.

In large multi-business corporations, a quarterly formal postmortem of one or two cases per session has helped institutionalize the learning process. In smaller or medium-size companies, this is typically a semi-annual or annual forum. The older the case, the more apt people are to forget what happened. We have found that new product postmortems should be conducted within 6 to 12 months from when they were killed or shelved.

In today's workplace of shorter employee tenure with the same organization, it is often necessary to interview people from the project who are no longer at the company. For every failed postmortem case study, customers who were involved with the new development must be interviewed to maintain an outside-in approach of "customers first" to the entire post-launch review process.

3. Standard case review format

There should always be a standard format to collect, analyze, discuss, and make recommendations for each failed product selected for review. All M&M conferences we visited use a straightforward and simple one-page format. The analysis for companies should also be brief and not resemble a lengthy report. The Table, next page, is a format for new product postmortems that was adapted from Mayo Clinic's M&M conference format and has been employed in many manufacturing companies.

4. Objective case analysis

Based upon our experience conducting many failed post-launch reviews, the project manager, like the attending physician, should never analyze or present his/her failed product or case. Competent, independent and objective investigators should gather chronological data about

critical events and decisions for the failed project. Most medical and company investigators use root-cause analysis to analyze and present each case. The principal investigator should review the facts of the case with the former project team before making the formal presentation. Every case is presented with the backing of relevant theories, science and related published articles. The independent investigators must be objective when developing and presenting the case because the audience of technical or engineering professionals will sense immediately when the truth or objectivity is deserted.

5. Safe learning environment

Every physician and company engineering executive we interviewed stressed the utmost importance of creating and maintaining a safe learning environment before, during and after each M&M meeting. Dr. Harry Rubash, chief of the Department of Orthopedic Surgery at Harvard Medical School, stated:

In the earlier years, M&M conferences were confrontational and not the safest learning environments. [We found the same in some companies new to conducting postmortems.] You must first have a non-punitive culture for M&M conferences to be effective learning experiences. It is typically the role of the respective department chairman or CEO to create and maintain the safe, but constructive, climate of critique. He or she must have that mind-set embedded in the entire department before each M&M case study and conference begins.

Dr. Daniel J. Berry, professor and chairman, Department of Orthopedic Medicine at Mayo Clinic, added to the need for a safe learning environment:

Format for a New Product Postmortem

1. Background

- Name of the failed venture.
- Dates project began and was terminated or shelved.
- New venture leader and cross-functional team members.
- Objective and qualified principal investigators.

2. Inputs

- Face-to-face interviews with people who were participants in the project.
- Face-to-face interviews with OEM and end-use customers who were involved.
- Face-to-face interviews with distributors/dealers and/or key suppliers.
- Obtain all e-mails, business plans, documents, trials, and project presentations.

3. Methodology

- Develop timelines and milestones of critical events or decisions.
- Document the unfavorable outcomes with data.
- Develop fishbone diagrams for the project and processes.
- Develop a root-cause analysis on the fishbone diagrams.

4. Recommendations

- What went well for the project.
- What went wrong for the project.
- Lessons learned and corrective actions.

Intuit regularly reviews failed or off-track projects at every operating division's monthly meeting.

The M&M conference must occur in a legally protected and closed-door environment. If not, problem outcomes won't be raised or the discussion will be so vague and brief that no learning or corrective approaches will occur. It must not be a punitive situation for the attending physician or any member of the attending medical team.

The atmosphere throughout each postmortem presentation must be factual and serious. We observed a high degree of spontaneous discussion at the well-conducted new product postmortems. The discussion after each presentation is often heated and blunt, but constructive. If tough and delicate issues are avoided in the closed-door meeting, the entire session will be of questionable learning value.

All project team members admitted having a sense of public shame from being wrong, but not a sense of guilt when it was an understandable mistake. After one post-mortem presentation, the project manager stood up and said to us, "I had no idea what I didn't know when we jumped into the project." The same reflective thinking and feeling of shame was found at Intuit. Jana Eggers, who heads Intuit's innovation lab, told us:

When I conducted a "When Learning Hurts" session for a software application that failed in its initial market but is now finding many customers in a different market segment or application, team members spoke of feeling the pain as their case was discussed. The feeling of pain occurs at most Intuit postmortem review sessions.

6. Conference leadership and the presentation

The moderator or leader of the M&M conference sits near the podium where each case is presented. The CTO or VP of engineering typically occupies this role in companies and must have the appropriate technical experience and respect, and be neither passive nor weak when encouraging constructive debate about sensitive issues or questionable decisions. Furthermore, the moderator of a company post-mortem or M&M conference cannot be a social cheerleader when seeking closure about what should have been done differently. As Dr. Edward N. Hanley, chief of orthopaedic surgery at Carolinas Medical Center, firmly stated to us:

The leadership of the M&M meeting is the most crucial aspect of the entire M&M process. A good leader sets the learning tone, has the reporting resident follow a timeline of critical incidents, presents the facts, keeps it non-personal, and enforces the ground rules. The M&M leader must also encourage open and often heated discussion, and then demand closure in terms of what the attending physician and team would do differently the next time—to say they'd do nothing different is unacceptable. The M&M process is only as good as the person in charge of the M&M meeting.

From our experience at many company postmortem meetings, the moderator should also help keep the case presentation and discussion period on the topic and on time. However, a strict adherence to time limits should not hamper the opportunity for people to speak up or learn from each case and develop better practice recommendations. The meeting leader should at times inject humor if a discussion gets too tense or someone in the audience becomes long-winded.

7. Recommendations from each case

Every well-led M&M meeting and company postmortem review requires the resident physician or company's principal investigator to state what they would have done differently. If it is a systemic problem, the changes required in the current system are discussed, outlined to the audience and corrective follow-up occurs. Dr. Berry at the Mayo Clinic stated to us:

Each case must be a constructive analysis, presentation, open discussion and then a deep-rooted search for improved outcomes or recommendations that everyone at the meeting can benefit from. This last step, Corrective Recommendations, is where the real individual, team and organization learning takes place.

Every M&M conference and new product postmortem must be an environment where anyone can speak up with recommendations, regardless of rank, title, age, specialty, or experience. Younger physicians in hospitals and young engineers in companies were quite vocal that no rank or hierarchical positions should affect who makes recommendations and what is said regardless of who is in the audience. In large companies, 100 or more people might attend a post-launch review meeting where one or more cases are presented. A number of companies widely distribute the “company confidential” postmortem report within the company. The names of project team members should never be listed or mentioned in the report or discussions.

The atmosphere at product postmortem meetings is meant to discourage attitudes of denial. The postmortem learning process, if well presented and correctly led, engages new product development people in a “corrective” view of their mistakes. All managers reported to us that the open forum resulted in learning and positively affected their future performance due to the specific corrective actions they later practiced. A number of executives shared with us their corrective actions that resulted from conducting postmortems on failed projects.

Recommendations from Postmortems

Most companies listed two to five major prescriptive actions from each postmortem study. Some of the corrective actions from CTOs, commercial managers, and our companies included:

1. Model the front-end business case after the venture capitalists' more rigorous approach to concept and feasibility studies that are not biased to incrementalism.
2. Have some engineering or design people dedicated 100 percent to new-to-the-world projects and separate them from technical people who support current customers and existing product lines.
3. Have technologists conduct voice-of-the customer interviews and relentlessly look for unmet user job needs at OEMs and end-users or the customer's customer.
4. Require certification in program and project management skills for all new product teams and stop using bureaucratic new product tracking approaches.
5. To develop more robust solutions and systems, involve strategic suppliers and co-suppliers as collaborators much earlier.
6. Require a strong intellectual property case as part of the front-end business strategy.
7. Develop value propositions and pricing based upon both laboratory and field trial data.
8. Shelve, kill or refocus projects earlier on different market applications.
9. Establish recognition and reward systems that encourage more company-wide collaboration and projects that significantly grow sales and increase margins.
10. Make process development a parallel activity to the development of new-to-the-world products.

In companies where postmortems were a routine activity for learning from failed ventures, executives stated that their new product success rate improved significantly. The CTO at a major specialty chemical company told us:

Since we began postmortems five years ago, we're now getting a lot more bang from our development and engineering resources. We are also seeing fewer tweaks and more proprietary next-generation solutions.

Common Threads at Company Postmortems

After attending M&M conferences and many postmortems in our companies and corporations that regularly conduct them, we asked ourselves, “What common threads were observed across these organizations?” With the proven M&M methodology for learning from mistakes as our reference point, we found three common themes at every M&M conferences, at company postmortems, and especially at Intuit, 3M and Toyota.

Strong CEO leadership is mandatory to begin to create a learning culture from reviewing mistakes.

1. Put customers first

The Hippocratic Oath or a modern version of it is part of the rite of passage for all physicians completing medical school. The oath stresses keeping the good of the patient (or customer) as their highest priority. Every M&M conference seeks to add to the body of knowledge to continually provide improved care to patients by asking, “What can we do better for the patient the next time?” Even though the employees at 3M, Toyota and Intuit never took a Hippocratic Oath, we found a similar emphasis on the customer as the primary reason they pursue innovation. Like the M&M conferences, the patient or customer was the center of all activity when these companies conducted new product postmortems. The following examples show how “the customer first” is at the core of these three companies’ innovation processes.

Toyota senior executives and engineers said they spent an inordinate amount of time with the dealers, sales people, and especially the technicians and service department employees who work on many different cars beyond the warranty period. Toyota’s executives are obsessed with building better cars for unmet customer needs.

3M has always encouraged technologists to visit their customers’ factories, laboratories and workplaces where people have job outcomes to perform—watch them, ask questions and then bring them new prototype solutions. This deeply-ingrained, customer-driven philosophy of technologists goes back to 3M’s founder, William F. McKnight, who said:

Get well beyond the purchasing agents because they know the unit price of everything, but not the value-in-use of our new solutions.

Intuit’s Scott Cook told us he often states to their software engineers,

No matter what your business problem is, go observe and talk in depth with your customers and prospects. Listen and observe intently. Major wins only come after bathing and swimming with present and potential customers.

2. Senior leadership is committed to postmortems

When we speak of senior leadership, we first mean all the Cs—chairman, CEO, COO, CTO, CFO—and then the group or senior vice presidents, general managers, and finally the department managers. Many senior executives spend little or no time on organic growth issues and creating the necessary “fast and smart failing” and learning culture that demanding projects require. In short, strong CEO leadership is mandatory to begin to create a learning culture from safely reviewing new product mistakes. Scott Cook told us:

I believe if the CEO doesn’t start the process to create a new product learning organization, it won’t really start. You have to realize that as a CEO, you’re a role model and an example for everyone. People

learn from your actions more than you ever believe. You can move values and create a learning culture if you so wish to start the cultural change. Openly and in company-wide forums state how you screwed up with stories about how you were wrong and what you should have done differently. Be straight, tell the truth about the many mistakes you’ve made, and you’ll build a bridge to your innovators. Have your direct reports do the same. Lead with humbleness and openness about mistakes—not with just hero stories and fraudulent behavior where mistakes are not safely discussed and learned from. Driving out fear must start at the top. Your people want and deserve a safe place to work. There is no learning without error. When we make mistakes, I often state, “How fascinating!” and then I ask, “What can we learn from that situation?” When you bootstrapped any new venture, you faced set-backs, mistakes and errors almost daily. That gives you a reference point for risk, fear, innovation, and growth the rest of your life.

3. Leave egos at home

After we attended M&M conferences and similar new product reviews at Intuit, 3M and Toyota, and at our own and other companies, we would later comment on each session with similar statements that included,

- “What a humbling experience that was.”
- “You could feel the peer-group pressure in the auditorium.”
- “The discussion period painfully helped everyone learn how to avoid repeating the mistake.”

Dr. Kevin Raskin at Massachusetts General Hospital summarized the always-humbling public learning experience from mistakes at M&M conferences as follows:

Physicians, especially surgeons, often are egocentric when their case is selected. There is no place for physicians with large egos at any M&M conference. In order to create a safe and constructive learning environment, egos must be left outside the M&M conference room. Everyone must come into every meeting with the mind set of learning and sharing in a humble, non-defensive and non-threatening manner when their case is selected.

Storytelling Sustains the Learning Process

A corporate culture of safely learning from new product failures must be actively and continually maintained with factual storytelling. Companies, like tribes, keep the good parts of their culture alive with oral histories. David Packard and Bill Hewlett, the engineers who founded Hewlett-Packard, were known for telling stories about failures, learning and successes as they wandered around HP's labs. Concrete, vivid and vicarious new product stories exert extraordinary influence because they transport people (especially skeptical technologists) from the role of critic into the role of participant. New product failure and success stories keep pessimistic listeners at bay. Storytelling bypasses the normal defense mechanisms including denial, "we're different," and "it won't work here."

The transfer of learning from mistakes through storytelling is a far more compelling way to help change mindsets and behaviors than pep talks or lectures. Storytelling doesn't replace objective root cause-and-effect analysis for failed projects. However, it is ideally suited to communicate change, stimulate, learn, and sustain trial-and-error experimentation throughout the organization. Because new product storytelling and M&M conferences are non-adversarial and non-hierarchical, they can be effectively used by people at all levels in the organization to change, maintain or institutionalize the culture of learning from mistakes.

The favorite form of sustaining new product learning at 3M is telling stories about new product development. The many 3M stories, including the famous one about Post-It Notes, help people connect with product development passion, setbacks, persistence, and success. 3M's penchant for new product development storytelling started with the company's first innovation heroes. The former CEO, Desi DeSimone, said at one of our market-driven product development workshops:

New product stories are our alchemy. They are like a medicine that helps us learn, heal and try another experiment. New product stories at 3M show people—product champions, teams and executive sponsors—how to transform dreams into innovation success. Stories help us to aim high, be persistent and learn from each other about technical and commercial challenges. The story-intensive culture at 3M isn't just an accident or act of folklore, it is a central way we encourage curiosity, creativity, experimentation, so-called crazy ideation, and a persistence to discover new opportunities in spite of ever-present obstacles. Hundreds of 3Mers sprinkle stories of success and failure wherever they go in the company to perpetuate the fickle culture of innovation. The stories of failure at 3M help reduce failures and also avoid near misses.

Learning Is a Team Process

Knowledge creation, learning, and sharing information are probably nowhere more important than in technical organizations where information quickly becomes outdated. Product development projects that go wrong are the raw material for organizational learning and improv-

ing new product success rates. Face-to-face learning from mistakes, like the M&M conferences, is sometimes painful, but vitally necessary if product development teams are to become more effective.

We stress the word teams over individuals because new product learning is always a cross-functional team process that involves multiple disciplines collaborating within and across an organization and with customers, suppliers and often outside third parties. The time-honored way in which medical teams learn from multiple disciplines, collaborate, and help each other safely learn from their negative experiences is lacking in many R&D, engineering, marketing, and business organizations. Hallmark learning companies embrace failure for its information value and thus minimize or reduce risk in future new product development decisions.

Against the huge cost of making the same mistakes a second, third or fourth time, the benefits of hindsight can contribute immensely to innovation success and shareholder value. High-performing new product companies realize that the ability to learn faster than their competitors is the only truly sustainable competitive advantage. These leading new product companies and the medical profession provide proven and practical guidelines for companies that have not yet learned how to profitably gain from the pain of their new product failures. ☺

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References and Notes

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2. Dobbs, David. 2005. Why Autopsies Are Good for Us: Buried Answers. *New York Times Magazine*, April 24, p. 14.
3. The three authors attended M&M meetings at Carolinas Medical Center, Cleveland Clinic, Harvard's Massachusetts General Hospital and Mayo Clinic, and interviewed physicians before and after each M&M meeting. A total of 15 physicians were interviewed at these four leading medical organizations. The authors also interviewed executives at 3M, Intuit, Nucor and Toyota to observe and ask how they routinely use the M&M approach to learn from their new product and new process failures. More than 35 technologists, engineering managers, commercial managers, senior executives, and CEOs were interviewed at these four companies.
4. The late Robert Adams, senior VP of R&D at 3M, planted the idea many years ago, with one of the authors, Jim Hlavacek, to research the medical M&M approach to learn from mistakes or failures. This article is dedicated to Adams, who, for more than four decades, shared many invaluable insights about managing technology, creativity, innovation, and growth.