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MANUFACTURING LEADERSHIP

In a Time of Change



A compendium of Manufacturing
Leadership articles from *IndustryWeek*

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INTRODUCTION

In times of change, good leaders can be a company's most vital asset. Today—facing worker shortages, skills deficits, digital transformations and a volley of supply chain disruptions—effective leadership skills are more critical in the manufacturing industry than ever before.

This collection provides a primer for manufacturing leaders facing these challenges. From problem solving and discipline to innovation and inspiration, these articles outline the skills, traits and mindsets of the industry's most effective thought leaders. Together, they can arm you and your management team with the resources required to thrive in the changes ahead.



TRAVIS HESSMAN

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SEVEN REQUIREMENTS FOR LEADERSHIP

*Eternal truths for
today's aspiring
leaders*

While cleaning out an old file from my days serving on the advisory board at the Tauber Manufacturing Institute, University of Michigan, I found some notes I'd used to discuss with the students the responsibilities of leaders.

The message is as true today as it was then for today's aspiring leaders. Here are the main points we discussed.

LEADERSHIP REQUIRES:

- 1) A strong work ethic. We can't expect more from our people than we are willing to do ourselves.
- 2) An attitude that we will do whatever it takes to get the job done. This communicates our high expectations and our pledge to the performance metrics we've committed to. (This, of course, requires no immoral, unethical or illegal behaviors!)



- 3) A “can do” attitude to challenge, and ultimately demonstrate a high energy level to smash, long-standing paradigms in the business. As Joel Barker says: Those who say it can’t be done need to get out of the way of the people who are already doing it!
- 4) A keen sense of urgency, a passion to run to the problems and a dedication to use good process, not heroics, to eliminate the root cause of problems.
- 5) The discipline to work with a sense of priority. Think in Pareto (80-20 rule) terms to deal with the most significant few issues, i.e., the ones that have real impact/leverage to improve the business for customers, shareholders, employees.
- 6) A sound time management system for daily use. Time is the only resource we all have the same amount of: 24 hours in a day. How effectively we use this scarce resource has a huge impact on our success or failure as a leader.
- 7) The ability to lead by example. Be the model for the skills development necessary to change how people think, work and behave. Educate, train, mentor, communicate, develop your people.

“Time waste differs from material waste in that there can be no salvage.” — Henry Ford

“Success is not the key to happiness. Happiness is the key to success. If you love what you are doing, you will be successful.” — Albert Schweitzer

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Editor’s Note: We need your questions for Larry Fast’s Ask the Expert: Lean Leadership series. Simply submit your question here: www.industryweek.com/continuous-improvement/send-us-your-questions-ask-expert-lean-leadership



FROM MATH NERD TO MANUFACTURING CEO

How a STEM kid found her calling.



“Do the math.” These are three words I heard countless times throughout my childhood. Though, admittedly, as the daughter of a high school math teacher, they were hard to avoid.

The fact is, math has always played a pervasive, foundational role in my life.

When I was a fourth grader, my father had me correcting high school math tests—red pen, answer key and all. In high school, I joined a team of fellow unabashed math nerds in competing for state and regional math championships. At Notre Dame University, my fascination with math and its myriad applications led me to pursue a math major and landed me in computer applica-

tions classes (long before computers were ever small enough to rest on our laps or fit in our pockets).

My affinity for all things numbers pointed me in the direction of Chicago Booth School of Business—heralded as the ultimate “quant” business school—and ultimately gave me the confidence to pursue a career in business.

Those three simple words—“do the math”—ignited in me a passion for STEM that guided my academic upbringing and turbo-charged my career. The path I chose that eventually led me to become CEO of one of the largest manufacturing companies in the country began by doing the math.

My story shouldn’t be so unique.

MANUFACTURING NEEDS STEM. AND VICE VERSA.

Reflecting on my path to becoming a CEO in manufacturing, an industry often overlooked for its pioneering of cutting-edge technology and embrace of STEM, I realize there is so much we can do to champion the immense opportunities a career in manufacturing can offer to STEM-educated women and men. STEM is the foundation of our globally interconnected, digital world, but it is also the cornerstone of manufacturing.

We must do more to address the troubling misconception that STEM-educated women and men are not best suited for the manufacturing industry, and vice versa. Not only am I living proof that, in fact, the opposite is true, but I am also here to tell you that manufacturing is on the cusp of becoming the new “it” industry.

I didn’t start my career in manufacturing, but there’s a reason I ended up here: I was inspired by a transformation taking place in the industry.

As a consultant on the outside of the industry looking in, I saw more and more manufacturing companies beginning to shift their focus toward designing innovative products and implementing the modern technologies we see industry-wide today. In that moment, I knew that I wanted to be a part of that change.

Now, innovation – and STEM – are everywhere in this industry.

While manufacturers may lack the cache of a digital brand like Alphabet, Amazon or Apple, U.S. manufacturers are harnessing the coolest, most cutting-edge technologies to solve customers’ toughest problems. Data analytics, automation, 3D printing, open sourcing of innovation, drones, artificial intelligence. You name it, odds are, it’s being done in the manufacturing industry.

At my company, USG Corporation, we’re taking our license to innovate very seriously. Our Corporate Innovation Center boasts a team of scientists with a range of advanced degrees. Chemists and engineers are hard at work developing more sustainable products that use fewer of our earth’s natural resources, while optical physicists perfect laser sensor technology to control how our products move through the assembly line with greater speed and efficiency.

We have also embarked on a larger \$300 million, four-year investment in advanced manufacturing to ensure our people, technology and equipment are working together in a highly-skilled environment to produce the best products for our customers.

WHAT’S NEXT?

In August of this year, I was disheartened by survey results from Emerson’s fourth annual STEM Survey, which showed that two out of every five Americans believe the STEM worker shortage is at crisis levels. That’s a problem, but I am optimistic that manufacturers can be a part of the solution.

As we seek to inspire the next generation of manufacturers, we cannot afford to continue accepting the status quo. We must encourage those who are excited about a career in STEM that they can find a home in the manufacturing industry every bit as easily as they can in Silicon Valley.

How do we accomplish this? By engaging with, educating and inspiring those in the very communities where we serve and operate.

We should be sending manufacturing professionals into classrooms to facilitate trainings and educational programs, offering access to our shop floors and research facilities, and deepening existing partnerships with top universities and research institutions. The benefits of investing in and preparing our future workforce simply cannot be overstated.

Sitting around my childhood dining room table, red pen in hand, helping to correct equations I was not yet old enough to understand, I had no way of knowing the eventual twists and turns of my career. It is my hope that the industry I now know and love is in a similar position: unaware of the opportunities that lie before us, if only we’re willing to do the math.

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FIRST, YOU'VE GOT TO SHOW THAT YOU CARE



You can't get people to care about their work until you first show that you care about them.

The overhead light in aisle two has been burned out for three months. It's hard for the workers in that row to see the small parts they handle and repair. Workers sent a request to the facilities department when the light died, but for some reason nothing was done, and no one bothers to complain anymore.

Fifteen percent of the stations are missing the adjustable stools workers sit on when they're doing repairs. Workers at those stations either stand, or use folding chairs, or office chairs. Another 10% of the stools are missing some of the casters, so the stools wobble when they sit on them.

The full-size paper drinking cups were replaced with tiny two-ounce cups by an over-eager executive in the finance department looking to cut costs. That may be fine if you're running an espresso bar, but not in an industrial facility without air-conditioning, where the temperature can easily reach 90 degrees in the summer.

Do I even need to tell you that the company is struggling with both productivity and quality? That workers don't seem committed to their jobs? That tool theft is a problem? That workers "steal" time by stretching their breaks?

I've been working with this company to improve performance on the shop floor,

but progress has been incremental. I've drawn value stream maps of the process, stood in an Ohno Circle and watched closely for the seven wastes, and engaged workers in Toyota Kata, but without a tremendous amount of success.

It was only after a couple of months at the site that I finally noticed the burned-out light, the missing/broken stools, and the pathetic paper cups.

My slow progress finally made sense: You can't get people to care about their work until you first show that you care about them.

Bad lighting, bad seating and bad drinking doesn't exactly scream care and concern.

Shame on me for not seeing this problem earlier.

As I've been reflecting on our slow progress, I keep coming back to the story of NUMMI. John Shook describes how within the constellation of GM plants, the Fremont plant went from worst to first in quality in one year, with a 180-degree turnaround in culture, all while keeping the same workers. (In fact, the only people let go were from management ranks.) Shook explains that what changed the culture at NUMMI wasn't an abstract notion of "employee involvement" or "a learning organization" or even "culture" at all. What changed the culture was giving employees the means by which they could successfully do their jobs.

At NUMMI, that meant the tools, the training, and the managerial support that was so badly lacking in the old GM organization.

Organizational development expert Edgar Schein argues that the way to change culture is to change cultural artifacts—the observable elements of an organization, which include what people do and how they behave. That's what NUMMI management did, by showing in all ways, large and small, that they cared about the workers and believed in their intrinsic motivation, and not just pushing product out the door.

What story do the cultural artifacts at my client tell? That management really doesn't care about the workers as human beings—no matter how much they say the opposite.

To be clear: I am NOT indicting my client for running some sort of Dickensian sweatshop. Having spent many days at their factory, it's clear that management really does care. And it's not as though the management is uniquely inept or cheap. In fact, the management is actually quite good—the new plant manager, in particular, works hard, is concerned

about employee welfare and is more than willing to spend money when he needs to.

But this issue is something that all companies deal with, at one level or another—issues that get lost in the shuffle, as they get passed from one department to another, or from one person to another. Or small issues that don't necessarily make it to the radar screen of leadership even if they're important to the employees.

But while they may be small, they nevertheless send an unambiguous signal of disrespect. And until management shows that they care about the workers, the workers won't care about the products.

I pointed this out to the plant manager last week. They now have a full complement of working stools and full-sized cups. They're working on the overhead light this week.

I'm hopeful that now we'll start to get traction. I'll keep you posted.

Dan Markovitz is president of Markovitz Consulting, a firm that helps organizations become faster, stronger and more agile through the application of lean principles to knowledge work. He is a faculty member at the Lean Enterprise Institute and teaches at the Stanford University Continuing Studies Program. His book "Building the Fit Organization," received the Shingo Research Award.

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A SHIP WITHOUT INFORMAL LEADERS ON BOARD IS A SINKING SHIP

In the name of self-preservation, middle management and line employees often push back or “slow walk” senior management’s direction.

Rapid change is a fact of life in today’s continually evolving manufacturing environment. Unfortunately, at many companies, senior management fails to realize how threatening change can be for middle management and line employees. Ultimately tasked with implementing the dictations and vision of top management, these personnel have built up ways of getting work done. Change often makes their tried-and-true approaches no longer relevant—and in some cases, even counterproductive.

In these cases, middle management and line

employees often push back or “slow walk” senior management’s directions. The end result can be suboptimal implementation of a change initiative or, at best, the eventual implementation of senior management’s vision—but at a substantially later date than originally anticipated.

In a worst-case scenario, the vision is never realized, with inertia on the floor grinding the initiative to a slow but eventual halt.

Suppose, for example, that you are planning to install a piece of capital equipment in your assembly

line that will not only improve throughput, but also reduce product defects from 10% to 5%. This sounds like a pretty good idea. Now look at this same idea from the point of view of the employees who work on your production line. This new piece of capital equipment will probably entail a significant amount of worker retraining with the possibility that some long-term employees might not have the skills necessary to operate it effectively. That is pretty threatening. In addition, productivity and product quality may decline during the training and startup phase, placing additional demands on your workforce.

In short, what appears on first pass to be an intelligent decision may run into substantial challenges and resistance.

The important point here is a simple fact of life that is often ignored in practice: While senior management in fields like manufacturing definitely have the power to prohibit something from getting done (e.g., they can refuse to fund a project), just because senior management wants to get something done does not mean that it will ever get done. In such cases, many successful companies have learned to rely on their “informal leaders” to help lead the way.

While C-Suite executives are the formal leaders within an organization, the informal leaders they need to seek out and engage are typically mid-level and line employees who see the opportunity inherent in the situation. These informal leaders help energize skeptics and build a consensus for change.

We have identified four different types of successful informal leaders (and there could well be other types that we have just not seen).

1. Self-satisfiers. Some informal leaders are able to effect change by helping their colleagues see “what’s in it for them” if the initiative is successful. This helps reduce the skepticism and nay-saying that can stifle any change effort before it even gets off the ground.

2. Consensus-builders. They will sit down with their colleagues and explain why the success of the initiative is so important to the long-term health of the company. They will encourage their colleagues to speak up and share any concerns or challenges they see with the new direction that senior management wishes to pursue. This “airing of grievances” eventually results in a strong consensus and commitment at the line level to the success of the new strategy.

3. Cheerleaders. We have seen informal leaders who win you over by their enthusiasm and high degree of commitment to the success of the initiative. These leaders are typically very well-respected among their peers and they leverage this respect to broaden the level of dedication among their colleagues to the program’s success.

4. Relentless Cheerleaders. Some informal leaders take this one step further and literally beat you into submission with their enthusiasm and commitment to the change program. I know of one informal leader who entered a store manager’s office at a big-box retailer and told the somewhat startled manager “I will not let you out of this office until you agree with me that you will support our program.”

Having worked with companies for over 25 years to improve performance—both inside and outside of the manufacturing industry—I consistently find that what differentiates successful organizations from those that achieve little or no return on their investment is not the quality of my analyses or the degree of senior management commitment to our program. Rather, what differentiates the winners from the losers is the ability of executives to recognize the importance of their informal leaders and energize and empower them to effect change.

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TRAIN OF THOUGHT: AUTOMATION LEADER'S ADVICE TO KEEP MANUFACTURING ON RIGHT TRACK

Mike Train, new president of Emerson Electric, says manufacturing needs to keep up the momentum in barreling through digital transformation and skills gap issues.

When he took over as president of Emerson Electric [IW500/71] Oct. 1, Mike Train started with a full head of steam.

First, he was officially introduced on stage at the Emerson Global Users Exchange, a gathering in San Antonio of 3,500 of the automation solutions provider's customers, from gas & oil to food & beverage. They made the trip to pick up the latest insights to aid in their digital transformation. This could be to make energy extraction and use more efficient, improve the cold chain, or making sure food stays safe, ensuring medicine gets transported properly, and optimizing buildings' climate control systems. Train calls them all "noble causes that we touch."

A startling revelation Train shared was that only 20% of industry leaders had a clear vision for this transformation, though 90% believed it to be important. A few hours later, his successor at Emerson Automation Solutions, Lal Karsanbhai, outlined a

5 ESSENTIAL COMPETENCIES OF TOP QUARTILE ORGANIZATIONS



detailed roadmap they are now offering to connect applications and businesses, and reach “top quartile performance.”

That morning presentation kicked off with a slick short film about two kids and their technologically savvy approach to the sidewalk lemonade processing industry. It's clear Emerson takes the skills gap serious enough so to make it the opening salvo of their annual event, and the tack of eliciting a childlike wonder to address it is the kind of thing we'd come to expect from General Electric a few years back when they launched Predix. (This film's score, awesomely cheesy 1980s synth music, was a pleasant new touch).

It should come as no surprise then, that Train kept the day's momentum going by hopping on a plane back to home base in St. Louis for a board meeting. The next day, Emerson announced their deal for GE's Intelligent Platforms business and its PLC technology, which complements Emerson's distributed control systems. Essentially what this does is fill a critical gap in their machine control capabilities, positioning Emerson as a power player in automating both process and discrete manufacturing. A year ago, Emerson went hard at Rockwell Automation to achieve the same goal before being rebuffed.

“It has been pretty clear over the past year that we had interest in the PLC space,” Train says. “Intelligent Platforms

fits well into our Automation Solutions strategy to serve customers across the process, hybrid and discrete markets and allows us to now offer best-fit control solutions.”

The new president, who replaces the retired Edward L. Monser, previously conducted Emerson's Automation Solutions business, which generated \$9 billion in revenue annually and employed 55,000 people. Now he's helping CEO David Farr oversee a growing business (5.11% revenue growth) that earns \$15 billion a year and employs 76,000 globally.

In between the big announcements, Train sat down with us to talk about the new role, and the new responsibilities he feels he has not only to Emerson, but to partners, customers and the next generation of manufacturers.

John Hitch: What are some of the industry challenges you are inheriting?

Mike Train: The big themes are managing around global activities. In the short term there's been the trade tension discussions. We have been caught in the middle of some of those things and are trying to advocate for some of those to settle out. We've started to see some of those settle out with the United States-Mexico-Canada Agreement.

In the long term, demographics are weighing heavily on a

lot of these societies. The Baby Boomers are retiring so we are losing a lot of experience, a lot of the history and sources behind the reasons why do things.

We're going to have to fill some of those skills gaps going forward, and I believe that will take changing the nature of the work. In individual context, how do you make that change?

We need people who have permission to change, the mandate to change. We support those efforts through the automation context and by working with our customers. Automation can fill some of the gaps. Solve some of the equations. How do we make the work more knowledge content based, so you get more productivity, efficiency and impact from your people?

It's something we face in our own business. There's high competition for resources and people. First, we need to attract them to our industry, and then over to Emerson.

JH: The video you played of the kids using somewhat advanced manufacturing for their lemonade business was clever and funny, but touches on a serious subject: if we don't get the next generation to learn these STEM skills, there might never be an Industry 5.0. What's your approach to this impending skills gap?

MT: If they don't learn these skills, we will all collectively come up short. We are trying to advocate in the communities we can touch, and we can touch communities on a global scale. We're trying to open up the eyeballs of the young, engaging with schools, giving them curriculums, opening up our facilities to give them a perspective on what we do. Sometimes we're in a neighborhood, but the community doesn't know what happens within our four walls. We want to share those things.

The video is all about curiosity and enabling that. Collectively, industry leaders need to be out there pushing and advocating an understanding of what these careers could be, and make sure the educational track is getting to them and reaching them, preparing them.

Check out the video here: <https://www.emersonexchange.org/americas/live/>. It's worth it.



EMERSON ELECTRIC

Emerson invites employees' children to learn about STEM disciplines.

JH: The problem doesn't seem to be getting kids excited about robots and tech. What seems to be missing is everyone involved in manufacturing, from the biggest OEM to small machine shops investing in real solutions. What do you say to that?

MT: Let's do it together. We have to do it together. In my own personal case, I was a complete failure. I have five children, three girls and two boys. The three girls were very accomplished in school, very capable—none of them went the STEM direction. That was a failure on me. Somehow, I should have made sure they had a good perspective on it and what the opportunities were. They have all gone on to great careers—and my one daughter who is a lawyer circled back to the technology realm and is now working with Magic Leap.

I feel like they found it eventually, we all need to do a better job showing how noble these professions are.

JH: Where's the disconnect?

MT: We've got to reshape the whole ecosystem, from education all the way through. Engineering education is boring. I challenge my university friends, and you can write me hate mail, but I always tell people, get into engineering, get through those

four years. Because when you come out, what you do every day is totally different. Hopefully, what we can do is make the education more appealing and more interesting, so it doesn't feel like you have to suffer through those three or four years. I have noticed educators are now picking up different ways of engaging and exposing students, taking on the mission of preparing these people for what they need to become.

Welding is awesome. Computer-aided machining is awesome. They make real things.

Everyone has to find their passion. We're very engaged with technical trade schools here in St. Louis, like Ranken Technical College. They're very fertile, they're innovating like crazy, maybe even more so than the four-year universities. And really trying to change their programming, really trying to hit their mark. And the average starting pay (up to \$60,000) is higher than the four-year universities in Missouri.

Emerson is providing \$1.75 million to fund scholarships for students from north St. Louis County to receive career and technical education. To date, this has helped more than 200 students from North St. Louis pursue vocation training at Ranken.

JH: There's also the matter of improving communities. A focus on the trades should decrease poverty and crime by offering better economic opportunities. Wouldn't that ostensibly fix several problems at once?

MT: We're based in Ferguson. We took on a personal challenge after the tensions to be involved. We've worked with educators from elementary to the high school, trying to get people from the high school to trade schools or universities. We've created internship programs on our campus to provide experiences and show what the possibilities are and motivating [students from Ferguson] to move forward and seek more education. And we're working with the larger business community to create the resources. St. Louis is a microcosm of what everybody is trying to deal with. Everybody wants a good economy, everybody wants their opportunity. We have to create those things.

We're also very engaged here in Texas, Louisiana, Florida. Also, in China and India. Trying to incubate a focus on STEM and have conversations with the communities we touch. And I know our customers do the same thing, and we're trying to partner with them.

JH: Any advice on how to start?

MT: You have to get personally involved. Find one thing you can work with as a leader, devote some time to it to try and understand the issues. Engage the political leadership, the educational community, and the broader community. Open up your doors, let people in, show them some things.

When I was young, I had the opportunity to have a job when I was 16. First fast food, and then with an electrician the next summer. For a long time, things have been so tight people haven't had those chances to work or understand what it means to work.

JH: The new workforce, many predict, will need a blend of blue-collar and white-collar skills. How can leadership help get these skills?

MT: Companies are going to have to provide those different skills set opportunities and provide different experiences. You work in this group for a while, now you have to work in that one. Broaden your perspective.

I've been with Emerson for 27 years. I spent 11 overseas, a very unusual but great experience. If you can, change the content of your role. Change your boss every three or four years. If you have the same boss for three or four years, you've sucked them dry, got all the goodness out of them. Get a different boss. People hate when I say that—except for the people who work for me.

Learning is the essence of life. Stay relevant, stay engaged. That's why it's very important to learn as you go. Focus on continuous improvement.

JH: You mentioned that in after this digital upheaval, even operators and technicians will need data skills. What kind specifically?

MT: If you're trying to run a facility from a predictive standpoint, there's going to be mathematics involved. The same if you're running an advanced computer-aided manufacturing work cell. With 3D printing, you need someone capable of running that tool who has an appreciation for all kinds of art forms. They have to understand mechanical things, electronic things. They do programming and measurements, tolerances, quality. Having that collective skill set is something people have to build. And you need the communication and collaboration skills. Those are two big ones that people need. We are looking for people who are collaborative and can network.



JH: Your survey indicated that 90% of industry leaders want a digital roadmap, but eight out of 10 are having trouble executing that. What's going on here?

MT: The resistance to change, especially in industries that are dangerous. There's been learning for 50 years. We're being conservative for a reason. We agree there's a need to be safe, but there are also opportunities for change.

The companies at the leadership levels are totally bought in and very excited. Maybe that comes from some of the IT background that they've had and things they've done. Now they want to bring that to the operational space. The big trick of this is going to be managing the middles. You can invest in technology, but if you don't change the job content, then that's probably a wasted investment.

We tell people not to go out and just do a big bang thing; we think they'll fall really short of what they expect the outcome to be. Make scalable steps, and then change the jobs and get management to come along. Have a roadmap, have a vision, go from A to B, not A to F. Come up with things that make a difference in people's business. Pick a few key performance indicators, focus on them and figure out what the steps are in bringing that technology forward. Discover what people have to do differently when you change their jobs. That's the tough part. How to get people to change their jobs. It's behavior, it's psychology.

JH: Have you experience this personally?

MT: In our own context working with business systems, I ran a group that was 55,000 people strong, and we were trying to create the right information to run the business. We had to upgrade and deploy IT solutions, and it's a very time-consuming effort. Any time we had a struggle, it wasn't around the technology. It was around the change management and readiness. It always came back to the people. We were doing it 55,000 different ways. Getting people to come into conformance and compliance and adopt something much more standardized also was a big part of the trick. People in Costa Rica don't want to have to change to the way people in China are doing it.

JH: What would you do differently?

MT: Be more sensitive. Make sure employees understand that we've worked to come up with a standardized approach globally that we think is strong, and match it back to the perspective of what they're doing now. Then make sure they understand why we're doing it. Sometimes we get into the details of explaining how it was done before and how we're going to do it now, but they don't know why. It all comes back to communication, collaboration and context.

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5 SUREFIRE WAYS TO KILL YOUR COMPANY'S INNOVATION

Many CEO's want innovation, but only after "the real work" gets done. News flash: It doesn't work that way.

Innovation is difficult to come by. It is a fleeting concept that eludes most companies. In fact, the odds of a new product idea reaching full commercialization are less than 4%. And that is the best case.

Preventing innovation, on the other hand, is much easier. Here are five sure-fire ways you can make certain innovation never sees the light of day at your company:

1. DON'T MAKE INNOVATION A TOP PRIORITY AND AN "ALL-HANDS" JOB REQUIREMENT.

Many CEO's want innovation, but only after "the real work" gets done. Here is a new flash: if you want to survive, you better make innovation "the real work". Make it a top priority for everyone in the company, not just the engineering department. How do you do that? By writing it into every job description. By rewarding and recognizing people who innovate. And yes, by asking people to leave if they don't.

2. DON'T GIVE PEOPLE THE TRAINING THEY NEED TO INNOVATE.

When you make everyone responsible for innovation, it can be very scary. People will be afraid they aren't up to the job because they are "not creative." Studies have debunked the myth that you are either born an Einstein or you're not. The truth is, everyone can be creative if they are trained in the principles of creativity. So, your job is to train every single employee. I hired a former chief creativity officer of the QVC network to teach my entire workforce how to generate new and novel ideas. He rode shotgun with us for the better part of a year, and now creativity is in our DNA.

3. DON'T GIVE PEOPLE THE TIME TO INNOVATE.

It is all well and good to expect innovation but not give people the time and space to do it. If you don't give them the time, employees will default to the tasks at hand—making the doughnuts. After all, they get paid to make the doughnuts. They are comfortable making the doughnuts. Unless you give them permission to do otherwise, that is all they will do. I tell my employees I expect 20% of their time to be spent on innovation. And I hire extra people, so we can get production and innovation.

4. DON'T GIVE PEOPLE A PLACE TO INNOVATE.

I built what I call a "Google-like campus in a factory," which is a high-tech space designed to facilitate innovation. Our employees named it the "Creation Station". My employees are welcome to gather there whenever they want to. And they often do, collaborating across the organization in the pursuit of new products and processes. Some people will tell you that such a space is a waste of money and it has no return on investment.

Most CEO's won't think twice about spending a ton of money on a CNC machine because it has a ROI. So does my Creation Station. It has returned orders of magnitude in ROI with new products and improved internal processes. The difference between the Creation Station and a CNC machine is the CNC machine has a finite useful life and must be replaced. Not so with an innovation space, as it constantly renews itself.

Other critics have said building such a space only gives employees the excuse to goof off there. To that I say, you have the wrong employees. So, get the right ones.

5. DON'T TAKE RISKS TO INNOVATE.

Without risk, there can be no innovation. The world of innovation is murky and uncertain. You must give people your permission to fail. Otherwise, they won't even try. I tell CEO's all the time, don't take risks—take big risks. Little risks have puny returns. Little risks don't motivate people to do extraordinary things.

I am not telling you to take "bet-the-company risks." You should never do that. Always validate risk as best you can with the information and market intelligence you can gather. And keep validating your assumptions along the way.

Bottom line, get comfortable being uncomfortable. Take the big risks and encourage your employees to do the same. What should you do if they take a risk and fail? Celebrate! Reinforce the "risk is a good thing" philosophy because that is the only way that innovation can happen.

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THE SMART WAY TO PREPARE YOUR WORKFORCE FOR INDUSTRY 4.0



Training for digital fluency, technological savviness and data analytics.

Is automation the job-killer that it's been made out to be in the past? Maybe not, according to a recent L.E.K. Consulting manufacturing survey.

Automation is motivating the decision-makers we surveyed across seven manufacturing industries to actively invest in their workforce, and four out of five say they're preparing for an increase in automation technology.

What do we think is behind this shift? As the workforce undergoes generational changes precipitated by retiring baby boomers and a growing cohort of millennials in the workforce, factories are changing as well — evolving from the pre-automation plants of the past to the smart factories of the future.

This path to progress is exciting, to be sure, but it's paved with some challenges and uncertainties. Our survey uncovered a persistent theme:

Manufacturers are worried about a skilled labor shortage. Workers running smart factories require digital fluency, technological savviness and data analytics know-how, to name a few. These are skills and capabilities that previous generations of manufacturing workers just didn't need and for which future generations may not be fully prepared.

What's the solution? We suggest taking a three-pronged approach, which we call "The Three R's": Retain, Retrain and Recruit.

First, look within. Retain and retrain current key workers, especially older ones with deep experience who will prove invaluable when transitioning the shop floor to an automated environment. Then look forward. Failing to plant seeds for the future recruitment of a digitally skilled manufacturing workforce will only undermine efforts to retain and retrain.

WHERE ARE THE SKILLED WORKERS?

Highly skilled roles enhance and maintain automated processes; machines simply can't run without the support and intervention of humans. At the same time, manufacturers continue to implement automated processes to increase productivity and maintain a competitive edge.

Unfortunately, manufacturing companies are facing a confluence of factors that are making it harder to find these skilled employees. Upwards of 10,000 baby boomers reach retirement age each day, according to AARP, and manufacturers, battling a negative image of their industry as low-tech and out of date, are up against stiff competition for younger workers from the tech sector. Furthermore, school curriculums lack focus on STEM subjects—leaving young adults underprepared for manufacturing jobs requiring proficiency in science, technology, engineering and math.

As generational shifts affect the very core of how factories function and the demographics of the workers who run them, manufacturing executives can take action by retaining and retraining current employees and recruiting technologically adept, well-prepared future employees.

RETAIN

Downsizing isn't a priority for most of the manufacturers in our survey, even with the current uncertainties surrounding trade. And while recruiting new talent is key, it's crucial for manufacturing companies to take stock of their proprietary talent pool—particularly older, more experienced workers

who are most familiar with the factory and have working knowledge of the company and its culture. Once these employees walk out the door, so does their knowledge, gleaned through years of hands-on experience—experience they can share with a new generation of workers.

So how do employers retain employees? As automation takes over lower-level tasks and the need for skilled labor increases, the industry is experiencing higher average wages and benefits packages to meet the demand for skilled workers. Quality-of-life initiatives, such as flexible work schedules and generous paid leave time, keep employees engaged and happy on the job. Improvements to the workplace itself have proven successful for employers as well. Take BMW, for instance. The automaker has reconfigured production lines with its highly valued, older skilled workers in mind. Modifications include replacing floors, installing easier-to-read computer screens, outfitting workers with special shoes and allowing workers to sit instead of stand while working.

RETRAIN

Manufacturers should be actively investing in their workforce through retraining efforts and upgrading employees' current skill sets so they can manage automated processes or take on "creative" jobs that are less likely to be replaced by automation. In addition, as automated tasks are phased in, simultaneously training existing workers with the incremental skills needed for higher-level jobs (e.g., data analysis, process improvements) can help mitigate the perceived threat of automation.



Management and human resources should take an active role in this process, identifying high-potential employees with the education and training that would align with higher-skill positions, and identifying those individuals who are most likely to stay with the company over the long term.

Cross-training and apprenticeship models are ideal and can be refined to fit the needs of the current and future needs of the particular business. Some companies, for example, have used the exodus of baby boomers to their advantage, enlisting experienced employees nearing retirement to train younger workers. Employers have also found great success using pay incentive programs to encourage employees to learn new skills.

RECRUIT

Retaining and retraining alone can't solve the skilled-labor challenge, and with the fluid nature of technology, employing younger, tech-savvy employees is necessary for running a 21st-century manufacturing company. Staffing agencies, online job boards, external search firms, and partnerships with tech programs/schools and community colleges, among others, are popular recruitment methods. Based on the ASQ 2018 Manufacturing Outlook Survey, 39% of companies have hired an agency to recruit candidates and 30% are working with local colleges.

Those avenues are examples of how to successfully recruit. But that doesn't solve the problem of not having a quality talent pool from which to recruit. From K-12 to college, schools aren't effectively preparing students for jobs, and many of the workers who do have jobs are falling behind. Lack of preparation ranges from basic employment skills such as problem-solving and teamwork to knowledge of STEM subjects.

Manufacturing companies (along with companies in other industries) need to work with their local education and training institutions to ensure a sufficient focus on STEM subjects and other relevant curriculums that ensure young adults graduate with the skills necessary to get and retain quality, well-paying jobs. For instance, 3M invests

in programs and initiatives to help increase interest and achievement in STEM, including the Discovery Education 3M Young Scientist Challenge. As part of this competition, scientists and innovators in grades 5 through 8 work directly with and are mentored by 3M scientists.

A JOB—NOT A PINK-SLIP—CREATOR

It's time to set aside the notion of automation as a job killer and focus on the challenge of having enough skilled workers to support the machines. Baby boomers will continue to leave the job market in droves—we can't change that. But the industry can change the younger generations' image of what may be seen as a lowbrow job to a high-tech profession. The industry can invest in multigenerational employee retention and retraining programs to strengthen and elevate their in-house team. Lastly, manufacturing companies can deepen the prospective employee talent pool by working with educational institutions and training centers to ensure children, teens and young adults are prepared for jobs that require science, technology, education and math skills.

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