TRANSFORMING A MANUFACTURING COMPANY INTO THE RECESSION-PROOF ENTERPRISE

INTRODUCTION: The Fundamental Challenge

During my 27-year career, I consulted for manufacturing companies from a variety of industries (automotive, aerospace, metallurgical, pharmaceutical, energy production, waste management, etc.) with the nature of my clients' projects ranging from solution of complex technical problems and reduction of cost to development of breakthrough innovations and creation of competitive advantage and growth. Despite of all their apparent differences, many of my clients ask the same question; namely, "What can we do to sustain our prosperity and growth during the tough economic times? Is it at all possible?"

Figure 1. The Bethlehem Steel plant went bankrupt in 2001, and has since been converted into the Sands Casino

Indeed, with the majority of manufacturers being a supplier to another entity's market offering and thus having no impact on the OEMs business strategy or the final design of products and services, these companies are very vulnerable (Figure 1) to the shrinking economy. When consumers stop buying, and demand for products collapses, the suppliers' orders shrink accordingly, leading to financial crisis and mass layoffs in an attempt to save vital resources. To appreciate the gravity of this scenario, according to the Bureau of Labor Statistics, during the last recession (12/2007 - 06/2009, http://data.bls.gov/timeseries/CES3000000001?data_tool=XGtable), manufacturers in the US lost 2,000,000 jobs (14 percent!), as shown in the Figure 2.

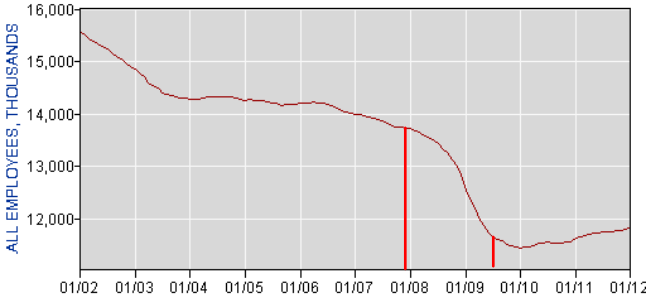

Figure 2. US manufacturers lost 2 million jobs during the last recession

PART 1: Embracing Innovation as the Way to Compete Smartly

The majority of manufacturing companies traditionally perceived innovation as irrelevant to their business and chose to compete based on low price, quality, just-in-time delivery, customization of orders, etc. As a result, manufacturing firms historically adopted and focused on deployment and use of DOE, Lean, Six Sigma, and other similar methodologies that enable achievement of their perceived priorities. According to the Georgia Manufacturing Survey conducted in 2010 (Fig. 3), less than 10 percent (see at

http://stip.gatech.edu/wp-content/uploads/2010/10/GMS-2010-report-of-survey.pdf) out of 494 manufacturing companies that participated in the survey chose innovation as their primary business strategy. Indeed, if the output of a mine operator is the same coal, while a plant assembles pre-designed cars or airplanes, a food producer makes the same candy bars or sausage, and an energy utility produces the same megawatts of electricity, is innovation as relevant to the manufacturing sector as it is to the rest of the commercial enterprises?

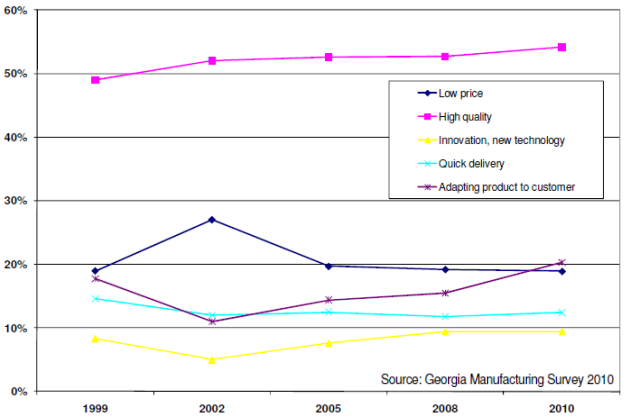

Figure 3. Top Manufacturing Strategies

To the surprise of many, the answer to this question is resoundingly positive because the manufacturing firms can innovate at the level of ANY corporate activity! Innovations in such domains as business strategy, business model, new product/service development contribute to the top-line growth, while unique and innovative solutions related to the operations (e.g. for the purposes of cost reduction, quality, reliability, productivity, and so on) lead to the bottom-line growth.

To illustrate further the importance of innovation for the manufacturing companies, here is a story of one firm's struggle with a production quality challenge shared with me by a client.

CASE STUDY 1

"*A toothpaste factory had a problem: they sometimes shipped empty boxes, without the tube inside. The retail customers complained to the supermarkets; the supermarkets in turn complained to the companies whose product the manufacturer made, who threatened to take business away from the manufacturer, if quality is not improved.*

Understanding how important that was, it was decided to hire an external Six Sigma consultants to solve the empty boxes problem. The project followed the usual process: budget and project sponsor allocated, RFP, consulting firm selection, and six months (and $8 million) later they had a fantastic solution on time, on budget, high quality, and everyone in the project had a great time. They solved the problem by using high-tech precision scales that would sound a bell and flash lights whenever a toothpaste box would weigh less than it should. The controls would stop the line, and someone had to walk over and yank the defective box out of it, pressing another button to re-start the line.

Later, the CEO decided to have a look at the project ROI. Results were amazing! No empty boxes ever shipped out of the factory after the scales were put in place. With no customers' complaints, they were gaining back market share. "That's some money well spent!" he said, before looking closely at the other statistics in the report. It indicated

that the number of defects picked up by the scales was 0 after three weeks of production use. It should have been picking up at least a dozen a day.

Puzzled, the CEO traveled down to the factory floor, and walked up to the part of the line where the precision scales were installed. A few feet before the scale, there was a $20 desk fan, blowing the empty boxes out of the belt and into a trash bin. "Oh, that!" said one of the workers responding to the CEO's question. "One of the guys put it there because he was tired of walking over every time the bell rang."

This story is typical. Similar inefficiencies (a poor solution to the right problem or, much more often, a perfect solution to the "wrong" problem) that only add complexity and cost abound at ANY manufacturing firm, in ANY production or business process regardless of whether a firm produces cars, coal, energy, or food. Millions of dollars are wasted needlessly, which always jeopardizes company's well-being but especially during the tough economic times when waste of precious resources is identical to committing suicide.

Since no company can control timing of the recession, drastic improvement of the survival odds demands for continual identification of strategic threats as well as operational imperfections/inefficiencies even when they are not obvious. Additionally, improving the odds requires effective and timely development of those innovative solutions that contribute to growth of both top-line and bottom-line. In other words, the firms must develop the capability for "innovation on demand", which, in plain terms, means the entire personnel's ability to develop the "**RIGHT**" solutions for the "**RIGHT**" problems at the "**RIGHT**" time.

PART 2: The Foundation for Creating Innovation Capability

Accepting the strategy of innovation-based competion is easy, as evidence supports its advantages. The true challenge is to implement it successfully because the data shows that innovation, as an activity, is indeed risky and unpredictable. For example, according to a study by Harvard and Deloitte, the probability of an innovation project to create a profit is below 25 percent (Figure 4). It comes as no surprise that, with chances of winning being very low, companies are very cautious.

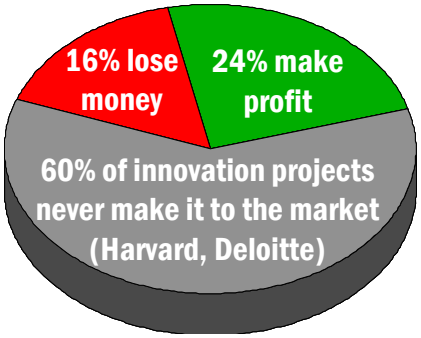

Figure 4. The probability of an innovation project to create profit

The contemporary literature lists many factors that can improve a company's innovation capability, with innovation-conducive culture, collaboration with customers and suppliers, teamwork, being mentioned often. While there are many innovation-enabling factors, they are not equal! In its potential to affect the results, nothing beats an innovation methodology; i.e. the processes and tools that the personnel will use to achieve the objectives and perform the tasks outlined above. The history clearly shows that in any type of an activity, the humans are as effective as their

tools are. In other words, without a hummer and a chisel, Michelangelo would not have been able to sculpt David while Copernicus would not have made his discoveries regardless of how talented they were, regardless of culture or teamwork! The effectiveness and robustness of tools primarily predetermines the outcome!

The choice of a methodology is a crucial but difficult step because literally hundreds of processes, methodologies, and techniques (e.g. brainstorming, synectics, chains of associations, morphological analysis, six thinking hats, etc.), pursuing the goal of improving the process of creating innovations, are available. Based on my own innovation projects success rate that exceeds 98 percent, I would not recommend any of them, as their track record of producing results consistently is very poor. Primarily, these techniques are based on the notion that effective creation of innovations becomes possible, if we can boost brain activities. However, without clear understanding of how the human brain produces the "**RIGHT**" solutions, this approach is unreliable and cannot shift the odds into our favor, which is required to beat the power of probability.

Instead of focusing on the brain activities, the alternative approach, which I strongly recommend, is based on studying "evolutionarily successful" solutions, with the focus on the problems experienced before the solutions introduction and what features / parameters / attributes of the solutions assured their success, thereby elevating them into the rank of universal "Formulae, Principles, and Patterns". Without providing too many details (they can be accessed here, http://www.strategicinnovation.com/gti), I want to illustrate this approach by going back to the first case study.

The problem addressed by the toothpaste manufacturer was "how to remove an empty box from the line." The first solution added the scales (thus, through the box weight parameter, identifying the candidate for removal), which adds complexity and cost, and then used a human-being as the removing agent, which required the line stoppage with another increase in complexity and cost. The second ("best-in-class") solution also used weight as the separation parameter, but it used weight as the box capability to resist a removing force. Also, instead of using an expensive "foreign to the system" human force, it used the force of moving air, which is cheap and readily available and provided by either a $20 fan or compressed air, which is also always available.

By analyzing what made the second solution a success, we can come up with the following observations/conclusions.

1. Introduction of a stand-alone separation procedure adds complexity and cost.
2. Separation should be based on a defective part different reaction to an outside "force" that ideally achieves both: the defective part identification and removal.
3. The force should be chosen from the already available and local cheap (or better – FREE) resources.

When we combine these conclusions, we create a universal "formulae" / principle for effective solution to ANY specific problem belonging to this type.

CASE STUDY 2

An automobile seat head restraint moves up and down along the guides (metal tubes) to accommodate different occupants, and a Tier 2 automotive supplier provided these tubes, which must be linear along their length to prevent jamming during the restraint movement. This requirement was not always met, which caused many complaints of the seat producer. The situation was bad enough for the decision to hire outside Six Sigma consultants to fix this issue.

A few months later, the project was complete. The solution represented an additional separation operation, where all the tubes blanks (before entering a centerless grinding machine) went through a calibrated bushing – an added control. A good part went through (Fig. 5) and on the conveyor belt, while a defective part was stuck in the bushing, the red light went off, the line stopped, a worker removed the part… It looks familiar, does it not?

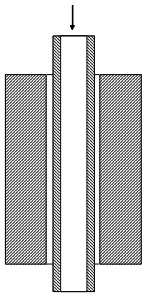

Figure 5

When the client engaged me to solve the line frequent stoppage problem, the decision to dismantle the previous "solution" was easy for me, as it contradicts to the "formula", which "prohibits" separate procedures of identification and removal of defective parts and suggests using a "cheap" force to accomplish both tasks. The only difference between the blanks is the curvature of a defective part, which makes smooth rolling of the tube difficult. If we use the "cheap" force of gravity (ALWAYS available to us) and an inclined plane, the good parts would have a greater speed (kinetic energy) comparing to the bad ones at the end of the plane. At that moment, they would have the capability to jump a calibrated gap between the plane end and the conveyor belt while the defective parts would jump into the trash bin "strategically" placed below the plane end. The process of solution and its introduction into the production took two shifts, and the implementation cost totaled about $50.

Now, if I asked you to separate non-round (either chipped or oval) pills from the good round pills after the stage of pills formation, would you be able to do it? It was another multi-million dollar challenge from a pharmaceutical company… All that was required for solving this challenge was to move a table from the end of an inclined guide and let the pills roll down the guide, achieve enough speed at the guide end to enable the "good" pills to jump the gap onto the table while the "bad" ones go down into the trash bin… It is easy to innovate (and save the millions) when the "RIGHT" formulae are known…

CONCLUSION: Innovation as the Ultimate Antidote against Recession

The provided examples belong to the group of "Operational" innovations that grow a company's bottom-line. The robust methodology (theoretical framework, processes, and tools) also exists for identifying and analyzing strategic challenges that lead to the unique and meaningful solutions growing an entity's top-line. Combined together and strategically deployed throughout the company, they lead to the creation of the company's "Innovation On-Demand" sustainable capability that will provide the "Right" Solutions for the "Right" Problem at the "Right" Time, thereby transforming any

manufacturer into the Invincible Enterprise capable of prospering during both good and bad economic times.

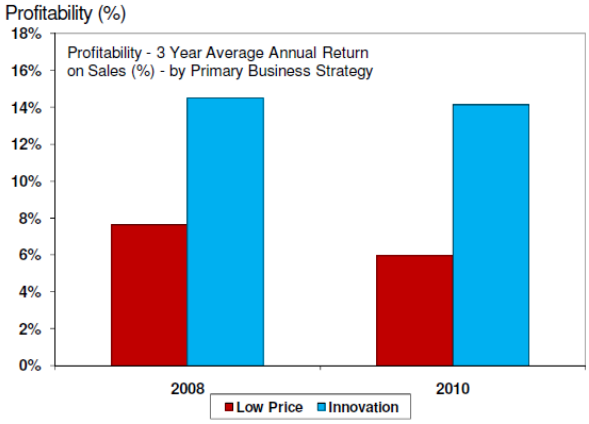

Figure 6. Average Return on Sales for Firms Using Different Strategies (2008 – recession)

In conclusion, we want to point out that the research data confirms the power of manufacturers that embraced innovation as their foundation to outsmart their competition. In the mentioned earlier 2010 Georgia Manufacturing Survey (Fig. 6), the manufacturers using innovation as their strategy are more than twice as profitable as the firms competing on the basis of low price. Moreover, these companies sustained their advantage and greater profitability even during the Great Recession of 2008, as it is evident from the chart. All of this allows us to state unequivocally that innovation is essential to the manufacturing companies' continual success and, especially, to their ability to survive and even prosper during the recessionary times.

KEY "TAKE-AWAY" POINTS

- Manufacturing companies belonging to the "Supplier base" are especially vulnerable during the recessionary times, as not only do they greatly depend on consumers' spending but also they depend on their OEM customers while having no influence on OEMs business strategy and the offerings final design. During the last Great Recession (2007-2009), the US manufacturers lost more than 2 millions jobs.
- According to the 2010 Georgia Tech study, those manufacturers that chose innovation as their business strategy (vs. low cost, quality, etc.) were as twice more profitable as their competition even during the recession.
- Innovation is absolutely relevant to the manufacturing sector, as companies can innovate on the level of EVERY corporate activity, ranging from solution of complex technical manufacturing challenges and cost reduction to improving business processes and creating new advantageous business strategies and models.
- Embracing innovation as the competition strategy, however, is not an easy proposition as innovation is very risky, with only 24 percent of innovation projects succeeding in generating positive returns.
- Substantial reduction of risk is though possible, if the right "innovation methodology" is chosen. While the majority of known approaches will only waste money, time, and other resources, an alternative approach rooted in science is available. Its adoption and deployment will lead to the creation of an entity's capability for "Innovation On-Demand"; i.e. the capability to come up with the "RIGHT" Solution to the "RIGHT" Problem at the "RIGHT" Time and on the CONSISTENT basis.