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NEW BOUNDARIES, NEW THINKING

Organisations and interviews featured in this edition include: Ministry of Justice, G's Agriculture, Wood Group PSN Kazstroy JSC, Radiant Law, Bill Bellows, Solar Group, Mark Gregory, AME 2014 Jacksonville.

IN THIS ISSUE:

The language of lean: Nathan Wilson is a continuous improvement specialist at the Ministry of Justice and in this article broaches the sensitive topic of going too far in to the lean bubble. How do you find the right level of lean knowledge without alienating those who just want the photocopier to work?

Lean engineering design: Raj Mohan Thiru, a lead mechanical engineer from Wood Group PSN Kazstroy JSC, comes to LMJ all the way from Kazakhstan and analyses the role of lean in the industry of construction and design.

Human lean– standardisation creating a talent hot bed: Consultant Mark Gregory returns to LMJ expounding the values of standardisation as a way of improving performance and living by the mantra of practice making perfect.

The treasure is where the rainbow ends: Klaus Lyck Petersen, group process manager at Solar Group presents a history of the organisation's lean practices and the lessons they've learnt along the way.



Lessons from Demings: economics of teamwork

“ The efforts of the various divisions in a company, each given a job, are not additive. Their efforts are interdependent ”

W. Edwards Deming



In 2005 I was invited to speak at a lean six sigma summit in Las Vegas. After a few days of iterations on where to place me in the programme, I was offered the role of the closing keynote speaker, one I accepted with both excitement and hesitation.

Excitement for being able to share systems viewpoints from my appreciation of W. Edwards Deming, Russell Ackoff, and Genichi Taguchi with an audience of LSS practitioners. Hesitation in following the opening keynote speaker, Jack Welch, the former CEO of General Electric. My ambition was to use the occasion to contrast the tenets of lean and six sigma quality with Dr. Deming's theory of management, much as I attempt to do in this series.

Much to my surprise, Jack Welch offered an assessment on the overall savings from

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six sigma quality projects across GE: “If I added up all the financial savings of the projects at GE it would have added up to the gross national product of the USA.” In other words, the savings from the hundreds, if not thousands, of application projects across GE, when added together, were colossal, and Jack Welch knew it.

Yes, they could be added, but the sum appeared to be noticeably inflated. What’s one to think when addition does not work? In keeping with the opening quotation from Deming, we can turn to Donella Meadows, an environmental scientist, for inspiration from her book, *Thinking in Systems*, with the statement, “You think because you understand one you must understand two, because one and one makes two. But you must also understand and.”

As a prelude to an explanation of “and”, consider a quotation from Tom Johnson in his book, *Profit Beyond Measure: Extraordinary Results Through Attention to Work and People*; “How the world we perceive works depends on how we think. The world we perceive is a world we bring forth through our thinking.” Regarding how we perceive the world, the impact of the difference between working together (the total is more than the sum of the parts), working apart (the total is less than the sum of the parts), and working separately (addition applies) can be examined mathematically by rephrasing Donella Meadows’ statement as a question; “What does one plus one equal?” For example, does one cup of water plus one cup of water equal one cups of water? Ditto for one apple plus another adding up to two apples? Yet, does the same apply to two co-workers each saving an hour in their tasks? Combined, would the organisation save two hours? Or, would two workers each saving \$100 save their organisation \$200 overall. Given the reality of systems, such an additive saving is nearly impossible.

The classic issue is whether or not the items being combined are interdependent or independent; that is, separate. In the case of water and apples, when accumulated, they are not dependent on each other. They do not work together, as teammates, to create a third apple nor a third cup of water, nor operate in such

a way that water would be lost (other than by evaporation) or part of an apple would be lost. But, in an organisation, our actions are always connected to others. We constantly receive from others and deliver to others. By comparison, can you imagine a co-worker who received nothing (data, reports, parts) from others (other than salary) and delivered nothing to others? That is, the worker was truly an island in the organisation, isolated from the others?

When we shift our focus to work and people, we simultaneously shift our thinking from independent cups of water and apples to people and their interdependent tasks. If the two items being considered are people working together, the results can be more than the sum of the parts; more productive than two people working independently. This is termed positive synergy. On the flip side, we could also see negative synergy resulting, $1 + 1$ being less than two.

Opportunities for discovering a lack of additivity apply to both the economics of for-profit and not-for-profit organisations. I have been served at blood collection centres by many volunteers who contribute their time and passion to these life-saving agencies. One volunteer who stands out is Mary, an elderly lady, who provided the refreshments after our donations, all the while providing us with a small sticker to add to our personal planners. Mary’s role included adding a date to each sticker to remind us of our next visit. With all the strength she could gather, she cut the one-inch wide stickers, one at a time, from a large roll. As she tired, she needed both hands to force the handles of the scissors together. I commented on the Herculean effort she expended to cut each sticker from the roll, much more effort to separate the stickers than I recalled from previous visits. Her matter-of-fact reply revealed an appreciation for her system: “Yes, somewhere, someone is saving money by no longer buying a roll of stickers with [easy-to-tear] perforations. What do they care about my effort?” she said, “I’m only a volunteer.”

Mary is not alone in experiencing an unintended-negative synergy-consequence of task-oriented organisations, where

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processes are divided into apparently separate, independent, tasks, examined for how best to reduce costs for each task, then reassembled into a new and improved process. In my role as a donor, I do not know the thinking behind the decision by the blood collection centre to purchase rolls of unperforated stickers. However, I have witnessed other situations where a determined attempt to achieve overall savings by piecing together local savings, resulted in overall losses. These cases serve as a reminder of the ease with which a seductive path of adding up the savings can be followed. They may also serve as a prompt for the possible outcome of this path by being aware of systems.

In example, the machinist whose task was putting small holes in a metal housing. He and his upstream and downstream peers were challenged by their manager, in competition with their teammates, to reduce the cycle time of each of their tasks. The housing machinist cleverly won the award by saving time by not devoting any additional effort to removing the sharp edges around the hole, a process known as deburring. Yet, the time he saved was nullified by a far greater loss in time when his peers were seriously handicapped by his un-deburred holes in their downstream efforts. Negative synergy strikes again.

I have also witnessed best efforts with cost cutting in an office environment, when the card-stock paper in dozens of three-ring binders used for hardware planning was replaced with a lighter weight paper. When the thinner, less expensive, pages tore, hole reinforcement circles, six per page, were regularly installed on hundreds of pages of planning documents. Another net negative reminder that we “must also understand and.”

Donella Meadows offers a reminder that the explanation of “and” depends on the nature of the relationship between the items being counted. When they are independent, such as combining apples or cups of water, addition does apply. When they are interdependent, such as combining the two components of aerodynamic drag, pressure drag and friction drag, aerodynamicists know what to think when addition does not work. They begin by realising that the “total drag” on an object is a combination of pressure drag and friction drag. Pressure drag can be lowered by reducing the frontal area of an object, as when bicyclists lay their upper bodies close to their bike, instead of sitting

upright. Frictional drag can be reduced by making an object smoother, as when surfaces are polished.

Golfers have benefited from the design of balls with reduced total drag. With dimples, they travel farther. How they do it requires the two components of drag to be viewed as interdependent, as a system, for dimples do not result in a smooth surface. Instead, they are known to increase frictional drag. But, the increase in frictional drag is accompanied by a far greater decrease in pressure drag, leading to a net savings in drag. Had they been managed without a sense of a system (as when all departments in an organisation focus on ways to lower their own costs - no deburring of machined holes, thinner paper for planning documents, and no perforations on stickers - to achieve total savings), one design team would focus on decreasing frictional drag, another on decreasing pressure drag, as if they were separate. As a result, golf balls would be smooth and polished and total drag would not be reduced. Instead, the designers use a loss leader strategy, deliberately making one drag component worse to lower the total drag. By increasing frictional drag, the golf balls travel farther.

Supermarkets do the same when they sell some products at a loss, looking to increase total profit when customers buy other products that are sold at a higher profit. By decreasing profit in one department, they can increase profit overall. What these situations have in common are examples of The economics of teamwork and what to think when addition does not work. They represent the limitless opportunities within organisations to purposefully manage resources, with a focus on exploiting interdependency, not unknowingly falling victim to it.

Through his work, Deming shared a vision of systems well-managed. In his book, *The New Economics*, he reminded us that “a system is a network of interdependent components that work together to try to accomplish the aim of the system. The greater the interdependence between components, the greater will be the need for communication and cooperation between them.”