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Doing more with less at Ariens: a leadership and transformation case study

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Abstract
Ariens is a family-owned manufacturer of lawn and snow equipment that designs, manufactures, sells, distributes, and supports its products in the United States, and more recently, internationally. Ariens faced and overcame a number of difficult challenges over the last decade by adopting and sustaining lean production principles throughout the organization, as well as with its suppliers and customers. This case study describes earlier business challenges, the changes that were made, how they were led, and the response of the workforce. The case study focuses on the period from 1998 to 2005, and a post-script updates what has happened up through early 2009. Ariens was studied because industry experts suggested that it was an exemplar of making and sustaining lean transformation. Our research confirms the commendable nature of these changes and their results. This case study details what happened and provides commentary on why Ariens has been successful.
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Introduction

Since comparative studies of automotive plants in the late 1980s identified and labeled the significant advantages of the "lean" Japanese plants, whether located in North America or Japan (Womack *et al.*, 1990), there has been significant effort to understand and apply these techniques in other industries.[1] While many firms have adopted and applied "lean" methods, few organizations have been able to achieve and sustain the desired outcomes. The evidence for success in adopting and sustaining lean and achieving long-term business gains is anecdotal. What appears in print are largely success stories reported in industry trade journals by company lean proponents or case studies in book chapters by authors promoting lean methods and consulting practices. The result for scholars and managers is that "two decades of discussion have yielded little progress" (De Treville and Antonakis, 2006: 100). In talking to knowledgeable industry people, they point to firms that have made significant changes using lean methods, sustained these changes, and extended their improvements to other facilities, their suppliers and customers. This case study reports on one company, Ariens [*pronounced â•rānz*], which industry experts identified as exemplary in using lean methods and sustaining change.

One challenge for firms adopting lean methods is change management, moving from their current operations to a new set of practices based on lean methods, achieving improved results, and continuing improvement efforts. The hallmarks of lean include eliminating waste, streamlining the flow of materials, and operating with little inventory. Each step in a production process provides what is needed when it is needed for its downstream "customer," producing the "lean" outcome – being able to produce in higher volumes with fewer resources at increased quality levels (Womack *et al.*, 1990: 13). When a firm improves using lean methods, it discovers that it must work more closely with its suppliers and customers to overcome limitations of making only local improvements and manage changes across organizational boundaries (Dyer and Singh, 1998; Dyer, 2000).

The theoretical and practical issues associated with change across organizational boundaries have motivated our search for the study of change at companies like Ariens. Lean methods define a "value stream," which consists of all the operations in producing a product or service, and cuts across unit, division, and organizational boundaries. A lean enterprise is the set of firms cooperating across that value stream, often by using these methods, in producing a product or service. Like strategic alliance and networked organizations, these lean enterprises create economic advantages rooted in cooperation across firm boundaries, including improvement on the multi-organizational system as a whole.

A lean enterprise is an organizational form that contrasts with large, corporate forms. A lean enterprise consists of cooperating organizations that are under-organized, loosely coupled, and polycentric (Roth, 2006). The enterprise is under-organized because individual firms arrange and optimize their activities around their internal units; it is loosely coupled because each firm has numerous customer and supplier relationships, and it is polycentric because each firm has its own authority structure, which does not go beyond its boundaries. As a cooperating set of organizations, the enterprise form differs along these three dimensions – organization, coupling, and power relationships – with conditions found in large corporate organizations. Large organizations are highly organized, tightly coupled and hierarchical. A large organization is highly organized because its managers have specified, evolved, and carefully managed relationships between units. It is tightly coupled because of its managers' aims to produce efficient outcomes that have resulted in little or no slack in its operations. Moreover, large organizations are hierarchical in that managers' reporting relationships and responsibilities are clearly delineated.

The importance of differences between lean enterprises and large organizations affects their processes for managing improvement and change. Because of the conditions in large organizations, change becomes possible when change agents develop interventions that relax conditions and enable improved ways of working. In large organizations, hierarchy and its power to require people do to what is asked can promote planned change. In examining the change management literature (Bennis, 1966; Beckhard and Harris, 1987; Kanter *et al.*, 1992; Tichy and Sherman, 1993; Kotter, 1995; Miles, 1997; Tichy, 1997; Nadler and Nadler, 1998), we find these methods are all based on a broad and common Lewinian unfreeze-model-refreeze approach (Lewin, 1952). For example, Kanter *et al.*'s (1992: 383) Ten Commandments for change provide a list that closely corresponds with Kotter's (1995) eight items. Both Kanter's and Kotter's lists can be viewed as elaborations of Lewin's (1952) fundamental three-stage unfreeze-change-refreeze model. "Unfreezing" involves disconfirming the present state and creating anxiety by pointing out that goals are not met or standards are not maintained (Schein, 2002: 36). Nadler (1981: 200) suggests making people "very uncomfortable," by feeding them data about their current situation to motivate change. Schein (2002) highlights the challenges of unfreezing, in that "psychological safety" is needed to prevent target groups from slipping into a psychologically defensive mode when faced with disconfirming information that is too threatening.

Lean enterprises present very different conditions from those found in large organizations. To start, although many firms are part of an enterprise, not all firms and their managers understand, accept, or cooperate based on lean concepts. Before conditions can enable changes, the many activities and relationships need to be understood and ordered. The goal of improvement efforts is not local optimization with an organization, but changes across organizations that produce greater effectiveness, efficiency, and other desirable outcomes for enterprise customers. These conditions raise a set of questions for enterprise managers: What do you do when your suppliers and

customers are unaware of their role in the lean enterprise? What can you do when lean enterprise improvements depend on specific organizational changes, such as when your organization's ability to improve requires changes in your suppliers and customers? How do you promote improvement and implement changes in these settings?

When we examine and see the contrast between lean enterprise and large organizational conditions, it prompts us to question whether organizational change theories and methods apply under lean enterprise conditions. "Most of the change models that exist assume that you move into a tightly organized structure and loosen it up to initiate change: entry, diagnosis, loosening up and change" (Cummings, 2005: 6). Studies of organizational change, where between a half and two-thirds of organizations struggle in implementing improvements (Beer and Nohria, 2000a, b; Sterman, 1994), suggest problems with existing change theories. When change study findings are coupled with the lean research, where lean operations are shown to be different from traditional operations, it suggests that we take a fresh approach studying changes in organizations that have made and sustained lean initiatives. We have taken an inductive, case study approach (Yin, 2003) in studying and writing about the lean transformation of Ariens.

Background and methods

The company and government members of the "Lean Aerospace Initiative (LAI) Consortium" (see website http://lean. mit.edu) supported this enterprise change research. The goal of this consortium, founded in 1993, was to develop, test, and apply lean production methods identified in automotive companies in the aerospace industry. In its first decade, the efforts focused on describing, defining, developing, testing, and implementing lean principles. These activities developed relationships among government, industry, and university members, which shared information and directed further research. All the company and government members have "lean" programs and work with each other to make improvements. Their lean activities have led to improvements across teams, departments, and organizations, while the LAI research agenda has expanded to the study of mechanisms for the creation of value at enterprise levels (Murman *et al*., 2002).

Many of these companies faced challenges in making and sustaining changes associated with lean, which is what gave rise to their desire for and support of research on lean enterprise change. The size, technical complexities, and long periods for results of the large corporations, government, and programs in the aerospace industry led us to seek out more bounded settings. It was through the knowledge and contacts of company managers, and their internal lean experts and outside consultants, that we sought out and identified Ariens. At the time, in early 2005, Ariens was considered to be an archetypal example of a lean transformation. The lawn and snow equipment business, however, is different from the large corporations and government industrial sites that make up the aerospace industries. The transformations of these massive enterprises, while producing some improvement across all stakeholders – customers, shareholders, suppliers, local communities, executives, managers, and employees – were still underway and uncertain as to their sustainability. Across all industries, most company's lean efforts had some beginning in the early 1990s. Ten to fifteen years later, in many cases, adoption did not progress continuously, change dynamics were still ongoing and outcomes were incomplete. The study of Ariens offered an opportunity to observe a medium-sized manufacturer using lean methods that had made physical and cultural changes to achieve better business results.

Ariens is located in a rural part of Wisconsin, has close to 800 fulltime and over 300 seasonal employees, and is substantially smaller in terms of annual revenues than most aerospace companies. The business is seasonal, making consumer and professional-grade snow blowers and lawnmowers. Given its products and markets, the size, scope, and focus of the organization changes, the process of change can be more easily observed than is typical of large aerospace companies. Our specific interests are on the elements of the leadership and change processes, which enable the successful application of lean principles and practices across the organization and in its enterprise – the customers and suppliers along its value stream. These conditions provided the opportunity to focus on the organizational dynamics of lean changes.

In June 2005, following a number of telephone interviews, exchange of information, and archival research, we made a 3-day visit to Ariens. We conducted eleven open-ended interviews – from the CEO to the factory workers – which lasted from 45 min to 1 h, toured the plant, had several informal discussions, and attended lean meetings. Prior to and after our visit, we interviewed

consultants who had worked for Ariens. Our interviews followed an ethnographic approach (Sanday, 1979; Spradley, 1979), seeking to have informants describe their experience from their perspective. To understand the nature and sequence of changes, we developed and continually updated a detailed time line of activities and outcomes in our interviews, asking participants to locate the events and experiences that they described in a temporal context. During the interviews, we took detailed notes which included verbatim comments of people's experiences and assessments around lean and change (Yow, 1994). We wrote field notes (Fetterman, 1989) from our own experiences in visiting Ariens facilities, touring their office and production facilities, and attending and observing lean events. Company officials shared internal memos and presentations that had been made of their lean efforts. We also sought and found local newspaper articles.

Using a grounded theory approach (Glaser and Strauss, 1967; Strauss, 1987; Corbin and Strauss, 1990), we coded and content analyzed these interview notes, internal documents, articles, and presentations. We used qualitative analysis and presentations methods (Miles and Huberman, 1994), following a learning history distillation process (Roth and Kleiner, 1998; Roth and Bradbury, 2008), to go from the codes we developed to four major themes from these data. This case is organized according to these four themes, each of which traverses the chronology of Ariens' efforts, as shown in Figure 1.

To best understand Ariens' lean transformation process, it helps to have the overall time line of events in mind. Therefore, before reporting on changes by these four themes, we set the stage for the transformation and its outcomes as of June 2005 by providing a chronological summary of some of the significant events that took place.

Chronological summary: a new dawn

It was 5 AM on 15 March 1998, when workers saw what surely must be an apparition. It was Dan Ariens, son of the chairman and great-grandson of the founder, walking through the factory greeting their colleagues. He said he was back; he would be taking over as the new President. Everyone knew him well; he had grown up here, gone to high school with some of them, worked with them on the floor during his college vacations, and then in various company management positions. But, 5 years ago, he left the area to move to Indiana to run a spare parts business. He was largely gone and mostly forgotten. Was that really him walking through the factory, and why was he back?

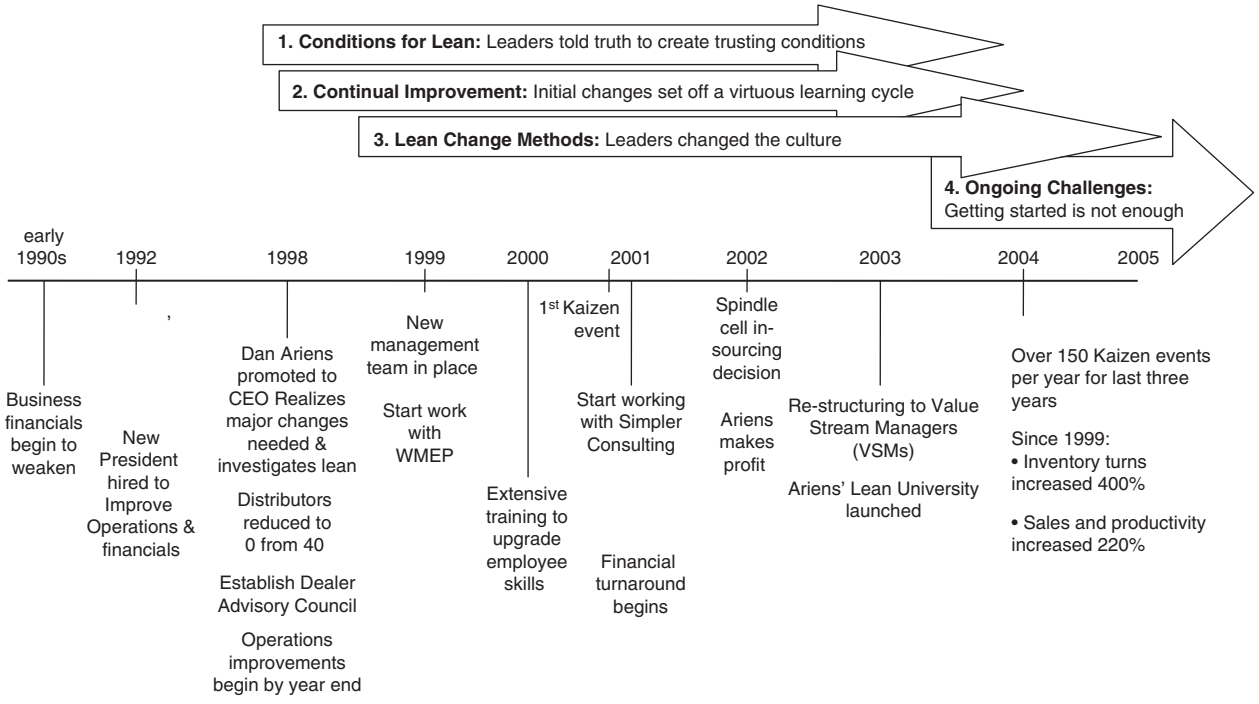

Figure 1 Mapping of case study themes on Ariens' change milestones.

Family members ran Ariens until Dan's father, Michael Ariens, himself an excellent craftsman and manufacturing engineer, stepped aside as President to become the Chairman of the Board. After several years of not being profitable, he brought in a new president, a turnaround manager, to put the company on a firmer financial footing. It had all gone well at first; sales were at record levels, and the factory was running at full tilt. But, while this new President had met his objectives, it was how he did it that bothered Dan.

Yes, sales were at record levels, but there was too much inventory, overall costs were too high, and quality was not nearly where it should have been. Dan was not convinced that they were on a firmer financial footing, and many of the people he knew in the plant were unhappy with how they were treated. What was troubling from a distance turned out to be worse than expected when Dan took the helm and looked more carefully. Ariens achieved its efficiencies and low overhead rates by producing at record levels, and filling the factory, warehouse, and dealer pipelines with inventory. The company was now suffocating on its inventory. Its costs were too high to sell its products through retail channels. Distribution costs ate most of the possible profit margins in selling through dealers. The compensation calculations in the previous President's contract gave him and his management team members huge bonuses for this production. This situation directed Ariens towards a recovery effort using lean production, in part to insure that they would never find themselves in that excess inventory situation again.

In his first year as President, in 1998, Dan sought out new methods and investigated the use of lean. In his first month, he terminated three vice-presidents and 12 director managers, and began forming a new management team. Loans were renegotiated with the bank, and intermediaries – distributors – had to be eliminated as a cost in reaching Ariens' dealers and their customers. Many of Ariens' products currently in inventory required refurbishing. Nothing was produced in some of its product lines for over a year because there was so much inventory.

By 1999, Dan's new management team was in place. The company worked with trainers hired through a state-sponsored manufacturing extension program (WMEP) to start implementing lean. By 2000, 100 employees had been through lean training and the first kaizen[2] event took place, but failed. The board workforce, however, grew skeptical and formed a unionizing effort. Despite the skepticism, Dan continued to push lean, particularly its philosophy of learning-by-doing and continual improvement. In 2001, Ariens hired Simpler Consulting because they had a reputation for being good teachers and pushing clients hard.

In 2004, after 3 years and over 200 improvement events, the lean improvement required a broad restructuring. Reporting relationships were aligned to product value streams. On the production floor, they converted assembly lines into manufacturing cells, and streamlined all operations. Lean was not confined to lower and middle levels in the manufacturing organization; senior managers from all functions, including finance, administration, engineering, customer service, and human resources, planned, led, and participated in lean efforts.

Seven years into its lean efforts, the company had made significant strides. It was on stable footing, with significant operational and financial improvements, as shown in Figure 2. Between 1999 and 2005, productivity increased over 200%, inventory turns improved over 300%, safety incidents had been halved (from their 2001 peak), sales increased over 200%, and profits improved by a factor of 10 (see Appendix for more details). In 2006, Ariens was named *Wisconsin Manufacturer of the Year* by Wisconsin Manufacturers and Commerce. Ariens' managers attribute these gains to its lean program. The thinking, process, and sequence of top, middle, and front-line management changes are the focus for this case study of lean transformation.

Four themes for lean enterprise change

This case study is organized by descriptive themes. The first two themes – Conditions for Lean and

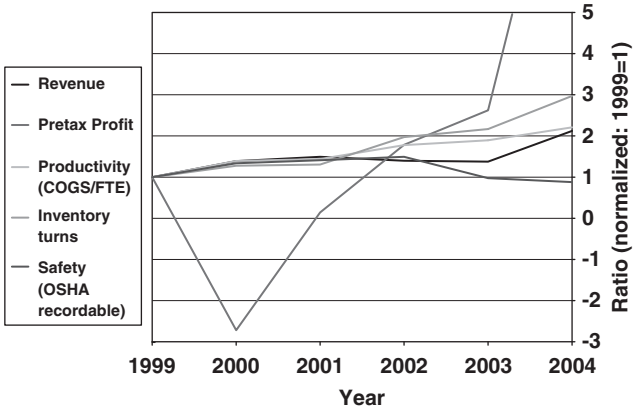

Figure 2 Ariens performance metrics.[3]

Continual Improvement – are relevant to how change efforts were started. These themes describe a new organizational context that was established early on in the change process, and continued to be a basis for ongoing efforts. The third theme – Lean Creates a Structure for Continuous Change – describes conditions that took some time to develop, and continue to be important to ongoing efforts. Finally, the fourth theme – Ongoing Challenges – identifies issues and asks questions about possible future problems that Ariens might encounter.

Conditions for lean: leaders created trusting conditions that persevered through adversity

There was no question that Ariens had a big crisis on its hands. If changes were not initiated quickly, the company would falter. The new lean practices at Ariens received unwavering support from the company's president, Dan Ariens. Beyond the need for a burning platform and top management support – Ariens' experience suggests a particular type of leadership communication and crisis management technique that enables successful change. Dan Ariens firmly established himself as the leader, brought in a new leadership team, and made the crisis facing the company visible to all employees. As such, Ariens provides an example of what it specifically means for a change process to have "top management support."

New leadership distinguished itself from the old leadership. The turnaround that the company needed to be profitable looked brilliant from 1993 to 1998. However, when Dan took over in 1998, he found that the company was in serious trouble. Dan staffed a new leadership team that was different from the past. He spoke about the past and future as two completely separate entities, admitting the need for change, thereby introducing hope and freeing his employees from beliefs like "that's just the way it is." Dan let the workers know he was in charge and the integrity that his name stood for, by entering through the factory at the start of the first shift on the day that he returned. This symbolic entry set a tone for the future … "We have principles, we will follow our principles, and … we are in a hell of a lot of trouble."

In his first month, Dan terminated three vice-presidents and 12 director level managers … "It was the wrong culture. It was dictatorial, 'Do it my way, damn it!'" Others described these managers as uncaring and disrespectful of humanity. One long-time manager explained that he was handed a list of people who he was to fire because the company had had a bad month. Without the opportunity to provide input, he was told to fire the employees on the list.

Ariens had always been a family company where employees were cared for, the environment was open, and there was a close-knit feeling. The legacy of leaders created what might be a benevolent patriarchy, in a good sense, in that it sought to balance its benefits to customers, suppliers, investors, owners, workers, and community. Dan was the fourth generation of family management and strived for an open company culture that valued employees while operating at world-class productivity, quality, and innovativeness. He created a list of core values that became his guiding light back to family-business values: "Be honest, be fair, keep our commitments, respect the individual, and encourage intellectual curiosity." Dan was committed to creating a "thinking, learning, and problem solving culture." In the face of an uncertain future, Dan created a new culture that was linked to past success, which, when juxtaposed to the way things had been more recently, inspired commitment.

The invisible was made visible. The visibility of the crisis to all employees contributed to achieving commitment to make and sustain changes. While the previous management created financial improvements, it hid what soon became a painful reality. They had revitalized a quintessential mass production company with mass amounts of excess inventory. This problem was not easy to see at first because the company had record sales, record production, and long production runs adding to efficiency. Everyone was very busy, and everywhere they looked there were stacks of products or materials to build them with. In addition, piece-rate production incentive bonuses lined operators' pockets as they never had before.

However, when the improvement programs under Dan Ariens started, it was soon apparent that Ariens had problems. When distributors returned the inventory they held, the stacks of products went beyond the factory itself, out into a secure area they set up in the company parking lot, and into the empty lots across the town of Brillion, Wisconsin. One-hundred-and-fourteen tractor truck trailers packed with products filled these lots. It was not only a seriously bad situation, but also much worse than the board had

envisioned. As one operations manager described, "It was a come to Jesus moment." Finally, its bank fired them. Ariens found a new lending institution, and with it the bankers' threat that if Ariens did not fix its inventory problem soon, the bank would pull its loan. According to Dan, "the financial guys at the bank … well, fortunately they trusted I understood what was going on. Otherwise, we would have been shut down. We had a burning platform."

The inventory crisis was apparent, but other crucial problems, like the financial situation, remained invisible to most employees. Top management realized the need to make the crisis clear in all ways to all employees. Under previous family leadership, company financials were not shared. Employees were under the impression that Ariens was "making money hand over fist." The company began to share its financial results with all the employees. At first, workers were incredulous, thinking that management was lying about financials because the results were so catastrophic. With some extra effort, which included identifying and educating influential employees on financial literacy, people were convinced that these were indeed real results.

Flexibility and perseverance enabled Ariens to adapt to bumps in the road. Initial efforts in 1999 to implement lean proved to be challenging. At first, Ariens worked with trainers hired through a state-sponsored manufacturing extension program (WMEP). These trainers were good at teaching ideas in the classroom, but fell short when it came to implementing events on the factory floor. At the start of its lean effort, Ariens put 100 employees through lean training. When these employees attempted to do a lean event on the shop floor, they ended up "fumbling" and never made any changes.

Not only was the board skeptical, but so was the workforce. The previous regime of command-and-control management, combined with the new management's pressure for quick action and employee and incentive pay changes, led to gathering dissent. An active effort to unionize the workforce was initiated.

Keeping the workers busy required taking on contract manufacturing work, diluting the focus to Ariens' core business. Diversification initiatives created new challenges – while they could make other products, gaining access to new markets and distribution proved difficult. These efforts were all false starts – many of them serious enough to derail the overall progress – but Ariens was able to persevere through these bumps on its road to improvement. The "thinking, learning, problem solving" culture that valued learning by doing and continuous improvement provided a resolve needed to survive these challenges. Starting over, redesigning, and trying yet once again were now an expected part of doing business. A statue of Vince Lombardi stood in *every* executive team member's office. The inscription on it stated the determination and perseverance that Ariens' leaders strived for:

> Gentlemen, we are going to relentlessly chase perfection,
> knowing full well we will not catch it,
> But we are going to relentlessly chase it,
> Because when we do, in the process, we will catch excellence.
> I am not remotely interested in being just good.
>
> Vince Lombardi

Trust in leadership. Dan Ariens' confidence in his workforce, and his ability to overtly distinguish his philosophy and vision from that of previous leadership and shed light on the severity of the crisis, renewed trust in upper management. In a small Midwest town where everyone not only knows everyone else, but they know their parents and grandparents, developing and maintaining trust to keep historical relationships intact was important. Trust was retained and built, because without it, the rapid progress in lean would not have been possible.

Upper management had to convince everyone from the shop floor workers to the board to give lean a try. At first, there was resistance from all directions. A lean consultant described the resistance of one manager this way: "it was like dragging him through mud." Many employees reacted with a skeptical "Ah, yes, we'll do whatever you want, whatever it is, it's just another program." However, employees pushed through their emotional responses and, despite many of them not understanding what lean was, they did what they were asked to do. To no one's surprise, the early kaizens were rough going. People needed to be told the importance of making the change to lean, retold and told again as they were coached through making improvements. Slowly they began to see changes and positive results. Trust deepened.

True believers led the change. Dan brought with him a strong sense of his family business' culture. As a

family member, people identified him with the business, and he combined that identity with a charismatic personality to confidently set forth a credible and compelling vision. As the adage goes, you must believe in what you sell. Dan was active in making changes, and learned to believe in lean. He communicated that the company's core values and lean were the answer to its problems. Employees at all levels recognized that "Dan is an absolute believer" and they acknowledged that "one of the reasons that lean was successful was because of how management believed in it." One middle manager reported, "I've been in a lot of lean environments, and there is a lot happening here at a faster pace than I normally see because of the top support … it is like Disneyland [for a lean expert] coming here."

Employees witnessed Dan and other top managers dedicate entire days to involve themselves intimately in lean events. Top management anticipated that there would be push back and expected that it would take between 1.5 and 3 years for the employees to be convinced that top management was serious – lean was not just a flavor of the month. Many of the decisions that top managers made were difficult, but they had to stick with them. One of the hardest efforts was in changing the piece-part rate bonus payments. How could a company become lean if it continued to give workers financial incentives to over-produce inventory? The senior manager who implemented the new pay rates met with each employee individually to explain the new compensation structure. Salaries were adjusted on an individual basis so that their new hourly wage rate compensated them for their foregone piece-part rate bonus.

As they embarked on their lean effort, Dan went to the manufacturing floor, where he once worked during his college summers and humbly explained that he was not an engineer and that he did not have all the solutions. He knew the workers close to the shop floor held many answers to key problems. He ended by saying, "You guys know, not me." One manager expressed, "you see people on teams that are empowered, they're ready to make their decisions … one of the ten rules that they have at that Monday event is that everyone is empowered."

Within a 3-year period, many Ariens employees became lean proponents, referring to themselves as lean "converts." "I'm a convert – now I believe it. I see things that now take weeks and months that used to take months and years." The positive results were undeniable and the enthusiasm around lean was contagious. "To see the work-flow improvement was amazing to see. There was almost a cult-like following around these kaizen events." Those who are part of lean events were willing to come in on Saturdays, work after hours, and take their workload home. Despite this time commitment "it wasn't too hard to get participation."

Continual improvement: initial changes created benefits and set off a virtuous learning cycle

If you had fallen asleep in 2005 and woke up in 2008, you would not recognize what you saw at the Ariens factory in Brillion, Wisconsin. Managers and workers had organized the factories very differently. Fifteen product lines organized into 40 cells replaced the four long assembly lines. The MRP system no longer scheduled production (it was still used to forecast material needs). Linking the cells were supermarkets,[4] holding parts and subassemblies. The upstream cell saw what it needed to build to replenish the supermarket inventory. Parts going to cells were stocked every 1 or 2 h, making it possible for a cell to switch to a different model up to eight times in a shift. The factory could make any product to demand at any time of year; gone were the twice-annual factory changeovers. A single big bang did not create these dramatic changes; it took accumulated alterations over 5 years and 600 employee-driven improvement projects.

Ariens' early efforts started small and resulted in little changes that created some benefit. Initial benefits instilled confidence, and enabled ongoing efforts. Small successes built upon themselves by encouraging new efforts, and the continuing changes accumulated into dramatic improvements. Executives made sure that they did not confine lean efforts only to manufacturing areas, but included all functions, such as engineering, administration, finance, and customer service. They asserted that if lean was to have an impact on their organization, it would have to be applied to every aspect of the business. Every member of the management team learned about lean and led improvements in their functional areas. Results were also not confined to business benefits; people at all levels had to learn, grow, and become more competent to make these improvements. Over time, the lean improvement required a broad restructuring that provided an alignment of reporting relationships to product value streams. These changes contributed to a series of multifaceted business outcomes and personal results that further reinforced progress.

Initial tangible changes showed that this effort was different. Ariens needed to make many changes to stay in business. Senior managers made strategic and financial restructuring changes. They built on long-standing relationships with the financial community to renegotiate loans and lines of credit. They changed their distribution system, cutting out the cost of distributors, to sell directly to dealers. They established the Dealer Advisory Council, which provided service and support to their dealers. They converted assembly lines into manufacturing cells, and streamlined all operations. These changes required leadership at many levels.

Lean efforts began in 1999 with a number of isolated efforts. Ariens hired managers with lean experience, experts with lean knowledge, outside trainers, and engaged Simpler Consulting to lead improvement events. From their initial value stream map, the executive team identified improvement projects. The priorities for selecting these efforts were willing managers and opportunities for "easy victories." The first two projects were in a gear case assembly and customer service. In the first case, the gear case cell was reconfigured; it went from 18 people making 100 pieces per month to four people making 500 pieces per month (see Figure 3). Customer service, an order-entry office operation, applied lean approaches beyond manufacturing. The experiences from these initial efforts were used as examples in approaching other areas and spreading lean.

Previously, it took 2 weeks of downtime and cost upwards of a million dollars to switch the factory over seasonally from lawn mowers to snow blowers. Costs were incurred while nothing was produced, and there were periods of inefficiency as the new line started up. Then there were seasonal peak production periods, requiring Ariens to hire temporary production workers. Production lines required building products to forecasted volumes and warehousing finished products to be ready the upcoming season. Forecasts were never accurate, especially when based on the weather, which is what drives snow blower demand. In the winter, when the production lines were producing lawn mowers for the summer season, it often happened that Ariens would suddenly need to build more snow blowers. Many things changed with lean. Before starting, managers determined the needed size of the workforce. There would be no layoffs from lean improvements. When improvements changed the number of people needed, they were reassigned to new jobs. Cells enable making any product at nearly any time. Efforts were now made to look out 12–18 months to forecast market needs and level the production load to avoid swings in the needed workforce. As production volumes have increased, lean methods have become increasingly critical in improving efficiency to keep up with new demand.

Again, changes were not limited to production. Payroll processing used lean concepts to reduce its needed staff by 50% in 4 years. In overall administrative areas, the employment had been constant while sales doubled and the number of transactions per order increased. Invoicing previously required three people; after lean was implemented, it was done as one person's half-time responsibility. There had been 18 people in customer service; after lean it was done at the same service levels with just six. These improvements were possible by reorganizing work processes along with other changes, including new information technology support. For example, clerks used to do the invoicing by mailing paper statements. After lean, they emailed and imaged

Figure 3 Gear case "before" and "after" kaizen activity workstation.
Source: Ariens Presentation (2000).

invoices instead of working with paper copies. As the workload changed, people went on to other work and jobs. For instance, instead of relying on outside contractors to install a new powder-coating system in one of its plants, Ariens used its own employees to complete the job.

Lean success became evident through the multi-faceted outcomes of business and personal results. At the center of Ariens' improvement effort was its success. There was success at many levels for customers, suppliers, investors, owners, workers, and the community. People felt empowered, there was broad and regular involvement in improvement efforts. In fact, in 4 years of lean activities, over 600 kaizen events took place, with over half the workforce directly involved in these efforts. Lean was not confined to lower and middle levels in the manufacturing organization. Senior managers from all functions planned, led, and participated in lean efforts.

Those we talked with during our visit said that there were changes in how management listened to employees, and lean had provided for job enrichment. Job enrichment was experienced particularly for people who became lean interns. The 6-month full-time lean internship program helped people become front-line leaders of lean efforts by teaching others about lean, making decisions to improve processes, and leading changes. The interns spent time in lean events, on follow up activities, and in training.

We heard interns talk about how their training in lean affected seeing waste – even when they were shopping at the store. It also taught them that they could do something about it, and that their efforts would make for a better place to work. This provided a workplace where "you can stay and grow … that's the real opportunity at Ariens, rather than going someplace else."

Inventory turns and productivity improved by many multiples, improvement project requests were readily funded, and the company operated so that it produced cash as it grew.

One of the important outcomes of its lean transformation was the growth in Ariens' business. Growth came from the company increasing its market share on every product line. Customers saw Ariens' products as having more features and better quality for the same price as competitors offered. Cumulatively, these changes enabled Ariens to access new markets. The restructuring of its distribution system enabled the company to price products more competitively. The pricing structure, along with a new product design, enabled them to hit the needed under 1000 dollar price to sell snow blowers through Home Depot.

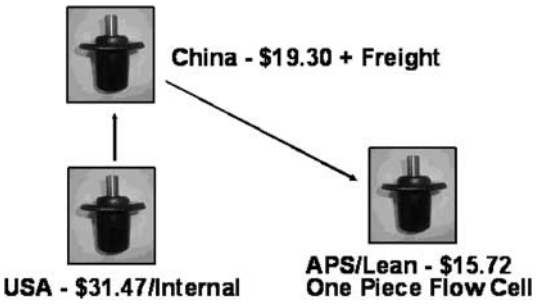

Figure 4 Spindle cost comparison.
Source: Ariens Presentation (2000).

Extra capacity allowed Ariens to "insource" production. For example, quality problems with the welding of hex nuts on a shaft spurred the company to bring that production in house. Supplier problems with the quality of the gear led to the development of a new design that was produced internally. When purchasing determined that it could source a spindle that was costing $31 to make internally for $19 in China, a kaizen team redesigned the spindle and its production to provide it at just over $15 internally (see Figure 4).

The restructuring of manufacturing operations also enabled multiple changes. Manufacturing floor space decreased 40% in 5 years, and travel distances for products decreased 90%, while the output doubled. Cells moved so that related product lines were located near one another. One of four plants became a company museum, and another freed up sufficient space to relocate engineering there.

Greater benefits came from aligning to value streams. After 3 years and over 200 improvement events, management restructured reporting relationships to take full advantage of lean approaches. Historically, Ariens had been organized in functional departments, such as engineering, purchasing, manufacturing, and finance. However, this reporting structure did not serve them well in improving as a value stream. Therefore, in 2003, Ariens reorganized into nine major value streams reporting to two operations vice presidents.

Moving to value streams as a central organizing principle helped focus improvement efforts to product and customer needs. The value stream managers were accountable for both ongoing

operations and incremental improvement activities. The people from traditional functional units moved to the value stream teams.

Lean creates a structure for continuous change: rigidity combined with flexibility, recognizing the need to upgrade people, and new communication channels lead to cultural change

When an organization adopts lean, it is unlikely it has a full sense of where the methodology will take it. It wants the superior business results that a lean company like Toyota enjoys, and knows that lean is a business model that will enable it to operate in new, and more efficient, ways. Ariens adopted "lean" because it needed to make dramatic changes. For Ariens, this included "never wanting to build that much inventory again," as well as identifying its business focus.

For instance, to reach pricing targets and new markets, Ariens could not afford the 20% cost of selling their products through distributors. Ariens needed to sell directly to dealers. The company also dealt with too many suppliers, and went from over 800 to about 200 suppliers. During this time, the company focused on its core business, and ended the contract manufacturing business it had created to utilize extra factory capacity. Lean principles created the framework for improvements, and implementing these changes made the focus for the new leadership team clear.

Lean created a structure that was both more rigid and more flexible. Lean is a set of tools and methods that enables people to think about themselves, their work, the relationship of their work to those they depend on and those who depend on them, and ways that they could together improve what they do to eliminate waste and create more customer value.

The essence of the lean efforts at Ariens is multiple small improvement teams working in week-long events. Events had specified pre-conditions, timetables, memberships, and follow-up activities. Detailed boxes of forms for every occasion of lean tool and event were available in Ariens' conference rooms. At one level, these were onerous and inflexible details. Yet, as we listened to what people told us, the rigid process created enormous flexibility. With lean tools, people collected, depicted, and analyzed data on their work processes in standard ways that taught new skills and a symbolic system, or language, to understand one another's roles. Over time, the information collection, depiction, and reporting processes enabled rapid and continuous improvement across the organization. For example, daily briefings at a specific time at lean team events according to standardized formats made it possible for senior leaders to attend, listen, support, and provide their authority to carry changes forward. Lean provided a structure and discipline to develop improvements, follow through, and make changes.

Upgrading people and creating new roles. The more involved conditions for the workforce required what executives termed an "upgrading of people." Ariens had to effectively deliver value to its dealers and customers while competing against companies from across the globe. This competition meant that they had to get its product to customers at a price that was equal with that offered by companies in China, companies that paid their people only one-fortieth of Ariens' wage levels. Management used a diagram, shown in Figure 5, to present this challenge to its workforce. To overcome the seemingly insurmountable wage differential, management pointed to the opportunity of eliminating non-value added work. Since only 5% of the time a person spent working directly added value (also shown in Figure 5), this presented a great opportunity for efficiency gains based on how people organized and continuously improved their work.

The ability to deliver better value depended on people having the right skills, doing the right jobs in a work system that was organized the right way. Ariens had been developing its people to achieve these ends. The lean intern program was one effort to have supervisors be leaders of improvement efforts. Ariens' goal was to have one team leader leading ongoing improvements per five people on the shop floor. In addition to formal training, people were mentored on improvements by supervisors and managers.

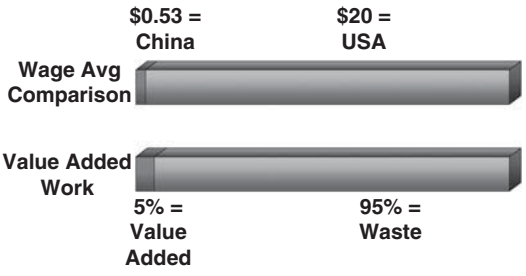

Figure 5 US and China wage differential.
Source: Ariens Presentation (2000).

The need to upgrade people extended beyond shop floor and clerical workers. Upgrading included the management ranks. Two strong, seasoned managers had run manufacturing. As the company organized efforts by value streams, it needed nine strong managers to run those value streams. Ariens had to bring those new managers up in terms of their skills to run those businesses. These nine value stream managers reported to and were mentored by the two seasoned managers of the product families – the walk-behind or ride-on family. Restructuring the organization into value streams was an essential part of lean, and one that was handled with caution. The manager responsible for the value stream was in a key position, and if the person in that role was not right, it was a recipe for a business disaster.

Value stream managers were responsible for their products at all phases of its life cycle – from conception on to design, development, production, service, and retirement; essentially they were running a business within a business. Engineering, manufacturing, marketing and finance people reported directly to the value stream manager. Value stream managers coached assembly leaders in production. They used lean to lead continuous improvement activities and these improvements extended to working with suppliers. Value stream managers also answered directly to customers – when a customer had a problem with their product, they called the value stream manager. These managers worked with dealers to ensure that their products and Ariens' capabilities delivered the promised value. For example, because of lean efforts, Ariens organized its production with a pull inventory system that produced to dealer demand. Dealers, therefore, did not need to take inventory risk by ordering inventory for a whole season. However, unless dealers understood and took advantage of Ariens' production capabilities, its capabilities provided no value to them. Value stream managers worked with dealers to help them understand how to get the value that Ariens was organized to deliver to them.

To be confident in their delivery capability, value stream managers needed to work with Ariens' assembly workforce to ensure it was operating as effectively as possible in its ability to deliver value. They also worked with design and engineering to improve their products based on their knowledge of what customers wanted. In addition to meeting their operational and financial goals, value stream managers had to make 10–20% annual improvement targets. These goals required metrics to capture performance and provide feedback on improvement progress. The value stream managers ran their businesses at world-class performance levels and made ongoing improvements because their efforts were embedded in a larger organizational system that was capable and supportive of lean initiatives.

New communication channels. When visiting Ariens, it was easy to be impressed by many lean activities and supportive behaviors at all levels of the organization. These were indeed indicators of successful lean change efforts. There were also indicators of deeper, more fundamental changes in the way that people thought and talked, particularly, about change itself. For instance, individuals who had led change efforts learned that if they communicated well and let people be part of the change, the people were much more receptive.

Managers practiced listening to employees, which led them to stop hesitating to provide their ideas to management. One of the lean interns stated how she had suggested several changes years ago, but the management from that time did not listen. Now these changes have been integrated into how the company does business. Employees participated in quarterly meetings in which management communicated how the company was performing as a whole. Employees were encouraged to ask questions during these meetings.

The participation of workers in the lean briefing meetings is another example of fundamental change in the communications at Ariens. There were several lean teams working on different projects each week. At the start and end of each day, there was a short briefing meeting in which team leaders presented plans or accomplishments. These briefing sessions provided opportunities for production workers to present and discuss ideas with managers, and for managers to hear them, and share from their experience possible suggestions. Having had the opportunity to sit in on one of those sessions, the authors witnessed an end-of-day review that had five teams reporting on their day's efforts. The teams reported on a range of projects, from detailed engineering part design improvements and a setup work reduction effort for a production machine to a proposed new standard work design for an office task. Each team had multiple members, not the lean expert, presenting

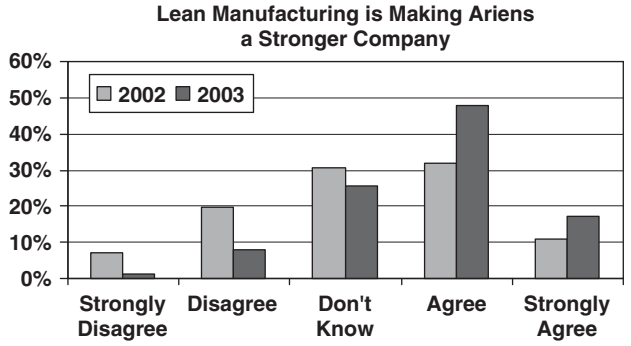

Figure 6 Employees' improving perceptions of lean. *Source*: Ariens Presentation (2000).

its information in articulate and well-reasoned ways. The managers, and one senior executive who attended, asked questions, made suggestions, and inquired into what help the team needed.

These latter changes were indications of a new, developing culture, one that supported growth and continuous improvement across all levels of the organization and reflected a growing acceptance of lean (see Figure 6).

On-going challenges: getting started was not enough

If, as some management books propose, one of the principles of lean is the continuous pursuit of perfection,[5] then Ariens readily embraced that goal. Among senior managers, there was less talk of what had been accomplished and more focus on what still needed to be done. "We're still not successful, we're doing better now, but we have not driven success yet over the long haul." As positive as the story of improvement and change was at Ariens, like all organizational change efforts, it was not without its skeptics and opponents. Much of the workforce hesitated at first until they more fully understood lean and could actually see the positive results of applying lean. Some workers were faster than others to go through this acceptance process. The remaining challenges included gaining broader and deeper acceptance by the workforce.

While many Ariens employees had embraced lean fully by 2005, others continued to struggle with change. Some of the older employees continued to resist working in new ways; employees tried to throw back to management some of the new responsibilities that had trickled down; there were still some people who complained; and some employees voiced skeptical views on management's motives to get people to work harder. Despite the effort that top management made to make the changes as clearly understood by the workforce as possible, some workers continued to withhold their trust in management. For instance, as described earlier, the senior manager who changed the pay rates met with all employees one on one to explain the change, and adjusted every salary so that it was a financial wash. However, Dan Ariens believed that some people would never forgive him for doing that; "The coach of my son's little league team [who works at Ariens] still hates me … some people will hate me forever." Change became a regular way of life at Ariens, but for some it was still never completely comfortable.

Managers talked about an ideal lean world where workers would make improvements without the deliberate efforts involved in special "lean events." Everyone would see through a lens that highlighted waste and every person would take on the responsibility to make improvements. While the Ariens culture had moved in this direction, the utopian vision was still to be reached. Employees were taking initiative, recognizing waste, and aware that waiting for events to make improvement was itself wasteful, but still they continued to depend on consultants for direction on lean events.

Like any organization implementing lean, one of the largest challenges Ariens faced was its ability to convince other organizations in its value stream to adopt lean. To maximize the benefits of lean across the enterprise, each organization needed to become committed to lean. Ariens had begun to teach lean to its suppliers, dealers, and end-users, helping them to become more efficient, and profitable, in their service and retail operations. But, for complete enterprise change to occur, these companies would need to lead their own lean transformations.

Ariens has launched a program called "Ariens Lean University," where suppliers can attend a 7-week course on lean, and end-users are able to participate in lean events at Ariens in Brillion. Ariens has also begun to lead its dealers from "A loaded dealer is a loyal dealer" to a "turn and earn" philosophy. Ariens' Partner Plus Program cuts down dealers' pre-season inventory, saving both dealers and Ariens pre-season cash and space.

One of the questions that Ariens asked was for us to judge in our case study efforts how they were doing in their lean transformation. Our findings have been very positive. The efforts that they have made are well targeted and have yielded

expected results. Many companies that undertake lean get to the point of seeing themselves ahead of competitors, and then relax a bit. Lean, as a philosophy, is not about just doing better than competitors. Certainly, that is important because competitive markets require companies to have products and service at good prices, performance and quality levels. However, a lean philosophy, like the one we heard from many of the people we interviewed at Ariens, is about continually looking for opportunities. One level of performance will certainly still have opportunities, opportunities to find and eliminate waste or improve value delivery.

While Ariens acknowledged their progress, they also spoke to their infancy in their lean journey. Completing his last interview with us, Dan gazed past us as he reflected on all the lean strategies underway at Ariens. He then abruptly snapped his attention back to us, and with the spirit of continual improvement stated, "but we are not successful yet."

Discussion

The adoption of lean methods and changes at Ariens has been described in this case from the inductive themes that were derived through a qualitative analysis of the interview data. The four themes – "Conditions for Lean," "Continual Improvement," "Lean change methods," and "Ongoing Challenges" – show a process of change that is different from traditional models of planned, organizational change. Traditional change models, all of which build on concepts first described in Lewin's unfreeze-change-refreeze stage model (Lewin, 1952), elaborated by Schein (2002), are similar to Beckhard's model (Beckhard and Harris, 1987), Kotter's eight-step (Kotter, 1996), or Kanter's ten-step (Kanter *et al*., 1992) change models. As shown in Figure 7, these change models all have a similar structure. People initiate change around significant events, unfreezing the *status quo* through disconfirmation, urgency, crisis, or a burning platform. Undesirable conditions prepare people and enable greater openness to new ways and changes. As operating in new ways or adopting different innovations are planned and implemented, what changed and was once new becomes another *status quo*, and the adapted way of operating. The progression of changes, based on our inductive analysis and presented as four themes in this case study, suggests an alternative pattern of change at Ariens.

Ariens' lean change process began as described in the section "Conditions for Lean." This start is shown by the top box in Figure 8, where leaders assess the situation. Dan Ariens, recruiting and then joined by other leaders, assessed a situation that needed to change. The change was sufficiently significant in magnitude to require new methods and processes. Lean was not initially identified as a method, but the nature of Ariens' problems was

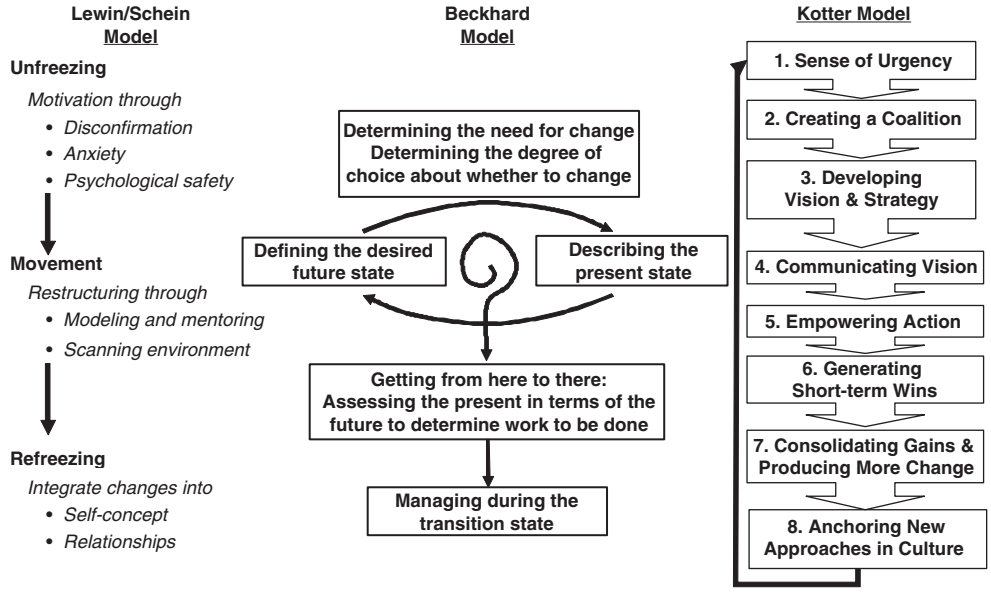

Figure 7 Diagram of change model stages.
Source: Beckhard and Harris (1987); Kotter (1996); Schein (2002).

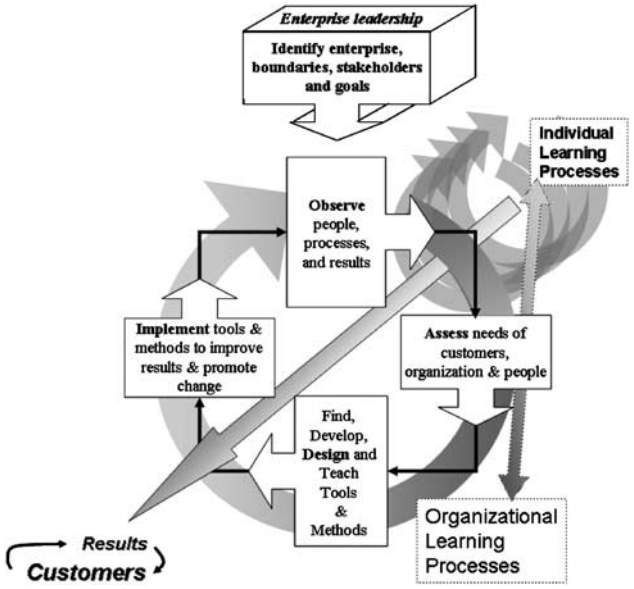

Figure 8 Diagram of Ariens lean change model.

seen in the context of a larger system view. The systems view extended beyond Ariens' inventory, production, and product problems to include factors in its larger business environment, such as costs of selling through distributors, connections to customers, relationship with employees, and requirements of its banks. Lean methods were chosen because of their promise to eliminate waste and produce "just-in-time," or without inventory.

Choosing and using lean methods initiated new learning processes. This learning began with leaders looking for ways to produce seasonal products that were more responsive to changing demand levels. Leaders created a conducive environment for Ariens' employees to use lean methods to gain insights and suggest improvements and changes that they themselves implemented. The individual learning, shown in Figure 8 as individual learning processes, was part of collective learning cycles, or the organizational learning processes also shown in Figure 8. Individual learning created people with better skills and knowledge, and organizational learning processes created the collective capabilities that enabled and sustained organizational improvements. These individual and organizational learning processes are what created the reinforcing conditions described in the "Continual Improvement" theme. Organizational learning takes place through a cycle that connects observation, assessment, design, and implementation continuously in a way that reinforces itself.

Lean methods provide tangible, visual indications of change, and collect data by which to assess improvement and performance. This feedback helps direct learning and change toward desirable results, which connect to the needs of customers, improve their satisfaction, and selection of Ariens' products. The implementation of changes aligned actions of employees with their managers' and leaders' goals. The involvement and support of managers sustained continuous improvement activities, which included organizational changes to align responsibilities with efforts, particularly in providing oversight across the life cycle of products from conception to engineering and from production to support and service through dealers. The involvement of people in lean methods started from production improvements, and quickly included engineering, administrative, marketing, and service functions within Ariens, and spread to outside organizations, to its dealers and customers. Lean involved teaching methods to examine and improve processes, so that operations could be connected to respond to customer (through dealer) requirements.

Leaders enabled the learning, application of methods and change process associated with lean by making commitments to improve not just production functions, but all tasks in all departments. Their widespread approach created consistent conditions across Ariens, involving all leaders in the broad and continuing use of lean methods. Ariens' changes unfolded from leaders' efforts applied across their company as well as with affiliated organizations. Ariens' people taught and used lean methods and applied what they were learning to make continuing improvements. Leaders shared insights with outside organizations, such as dealers and customers, regarding how they changed through lean methods.

Contrary to change approaches that emphasize, disconfirm, set goals, make plans, and implement new approaches from the top-down models, Ariens taught new methods, had leaders involved and creating supportive conditions, and let improvements roll up from many changes at working levels. What people learned through producing improvements in one area spread to other areas, including application across departments and organizational boundaries to affiliated companies. Since it was the people who were affected by changes that were implementing improvements, based on insights from lean methods, they sustained what they improved and extended what they learned by

applying it to other settings. Ariens' changes did not congeal as a new *status quo*; its people developed a continuous improvement capability by their ongoing learning and applying of lean methods.

Implications

Lean is not a cost-cutting device that can be inserted in an *ad hoc* manner into a manufacturing process. A lean transformation is not guaranteed, even if an organization follows carefully the operations principles involved in lean, including value, value stream, flow, pull, and pursuit of perfection. To achieve success at lean transformation, lean operation principles must be practiced within the context of a fully supported lean culture. The question is, how does an organization develop and sustain lean cultural principles?

It has been found that transforming a company's social system requires extraordinary leadership as well as vision. Krishna (2008) recently interviewed 50 companies on their lean efforts and found that extraordinary leadership and vision were operating simultaneously in only one of the companies surveyed. We can see from studying Ariens, where extraordinary leadership and vision dovetailed, that a lean culture values promoting feedback and open communication, organizational learning, and supplier education, among other ideals. These practices are made possible because Ariens' leadership adopted a collaborative management style.

Abandoning the competitive style that many American managers employ enables managers and employees to participate in two-way and bottom-up communication across all vertical and horizontal boundaries within the organization. If properly supported through a collaborative non-competitive style, the culture of lean can permeate an entire organization and even spread across structural boundaries to suppliers and customers resulting in a true lean enterprise.

Closing comments

Learning and improving the capability to learn collectively are the underlying processes needed for lean to be successful and sustained. When managers and experts teach and use lean tools, they provide new insights from performance data. Those insights are the basis for making improvements, and the data on performance provide feedback on current and future progress.

As described in the "Continual Improvement" theme, the cycle of setting expectations and trying new approaches, collecting data, making changes, assessing outcomes relative to expectations, and adjusting approaches is an organizational learning process. In the "Conditions for Lean" and "Ongoing Challenges" themes, to complete the learning cycle, the organization needs an openness and broad trust in making data visible to provide feedback on expectations, activities, and results, as well as full engagement of the organization's leaders in the process.

The implementation of lean at Ariens follows strictly defined tangible steps and procedures. Paradoxically, whether it is intentional or a fortunate side-effect, these procedures increase communication across levels in the organization by requiring various levels of management to listen carefully to production workers. Employees, trained to see waste, are encouraged to communicate what they see. The strict procedures also lead to the feeling of empowerment and opportunity among employees by requiring teams, as opposed to individuals, to make important decisions. The new way in which work is organized enables teams to respond quickly to make the needed changes. In essence, as described in the "Lean change methods" theme, lean's rigidity provides the flexibility critical to continual improvement and the success of lean at Ariens.

As part of its mass production heritage, Ariens is a vertically integrated company. In addition to assembling snow blowers and lawnmowers, it also does stamping of metal parts and other basic fabrication work. An organization within a lean enterprise contributes to the value stream in which it has the highest value added, while it sources some parts from suppliers who produce at lower costs or higher quality. For example, suppliers produce 69% of the value in each of Toyota's vehicles, compared to the roughly 55% of value from American companies' suppliers, enabling Toyota to use 10% fewer workers with 25% less inventory and 35% fewer manufacturing defects on average, per vehicle, than American manufacturers (Dyer, 2000). Managing as part of a lean enterprise might provide cost and quality advantages over vertically integrated production organizations. While Ariens is far from a monolithic organizational behemoth, expanding its lean capabilities to its supplier enterprise might provide additional cost, product, and market benefits.

An important focus for this discussion, given the interest in the process by which lean enterprise change takes place, is what we saw to be management issues. Ariens has already made, and seems well positioned to continue to make, significant productivity gains using lean (see Appendix). Ariens has grown its annual revenues while maintaining relatively flat employment levels, and reducing only its use of temporary workers. One challenge that management will face is developing the opportunities for business revenue growth. The lean efforts will continue to enable Ariens to do more with its existing workforce. It is not clear if Ariens can grow its sales to existing markets at a fast enough rate to absorb its productivity gains. Alternative opportunities for growth would come from new products that provide access to new market segments. As Ariens competes on a cost basis with component prices from overseas suppliers, it might also be able to grow by marketing products internationally. Selling internationally, as well as developing products of new market segments, will require new and stronger capabilities in engineering and product development. These are areas where Toyota, the prototypical lean company, has very strong capabilities, and where there is an opportunity for Ariens to develop its capabilities.

An effective new product development capability is a characteristic of "lean" enterprises. The automotive study that coined the term "lean" found that lean companies used half the engineering hours and new product development time as mass production companies (Womack *et al*., 1990). In subsequent studies, researchers found that lean principles extend beyond production to include all aspects of business activity – marketing, product design, engineering, supply chain management, sales and service (Womack and Jones, 1996; Liker *et al*., 1999; Liker, 2004). Ariens applies lean methods, and gains benefits, across all its business functions. Many of these have been oriented to improving efficiency.

A future stage for lean application needs to be in product and market development. There will be pressure for growth opportunities as production efficiency improvements allow the existing facilities and workforce to produce more. Ariens will also need to be able to introduce new products that are lower in cost, higher in performance, and better in quality more quickly. We have also seen "lean" companies acquire companies in related businesses. These acquired companies are generally complementary, providing opportunities to reach new markets and customers, leveraging the current products and services. Acquisitions also provide improvement opportunities, particularly if they have not yet developed the lean and continuous improvement knowledge that Ariens has.

We are impressed by the efforts and attitudes toward lean, which came through all the people we talked with. While some workers and managers raised concerns, the commitment toward lean and business achievements is enthusiastic across the board, including all functions represented on the management team. The operational and financial improvements of Ariens (see Figure 2 and Appendix) are quantitative and tangible indicators of better results. Our interviews indicate that the eagerness and commitment to lean is well beyond a few experts and managers pushing a solution and changes onto a workforce.

We are, however, somewhat cautious in extending our praise at this point in Ariens' lean transformation. Ariens is in the middle of making a set of changes and addressing all their implications, yet the changes are not complete. Ariens expects to pursue additional and continual improvements. While consistent with lean philosophy, there also seems to be something missing from this point of view. Ariens' continuous improvement is important, but what is missing is a compelling vision for where to go for that improvement. It has dodged the bullet of overproduction and is on firm operating ground, but needs to replace its response to a crisis with the pursuit of a vision. Where does the company want to be? What will be its future business and markets? How will it build on its existing capabilities and workforce? The absence of that strategic direction and a compelling vision that engages the entire organization may be a limitation to both its progress with lean and the company's and individuals' future growth opportunities.

Post-script

As reported in this case study, Ariens' lean efforts began in 1999 with a change in the company's president and management team. Interviews for this study took place in 2005, with data collection and updates made up until the draft was reviewed and approved by company officials in the fall of 2006. In those 6 years, as is written in the case, Ariens achieved substantial improvements across many dimensions – including reductions in

inventory, rework, scrap, and cycle time and improvements in sales, productivity, profits, safety, and morale. These improvements were accomplished by creating conditions for lean, building on initial changes with continual improvement, and leaders' involvement with lean to change Ariens' culture. While these efforts were effective at the time interviews were conducted and data were collected, what has happened since that time in the last 2 years? The case study proposed that Ariens had not only bettered its results but also set in place conditions for continuing on its lean transformation path. The case study also reported possible limitations to continued improvement, including the need for a compelling vision to engage the entire organization, future revenue growth to enable productivity gains, moving beyond vertical integration, and improving its products and development process by working with customers.

Follow-up telephone interviews and other information about Ariens in late 2008 and early 2009 find Ariens continuing in its lean transformation and showing benefits of the changes. Ariens has complemented the lean process changes reported in the case study with the changes in each of the following areas:

Production Facilities. Over the last 3 years, Ariens has invested over $6.5 million in capital projects annually. Ariens has replaced its one painting facility with several modular painting facilities designed around lean flow principles: finished parts are placed on custom racks for each unit, rolled into the paint booth, rolled off into the cell, and assembled into the finished product. Ariens has focused on one-piece flow, kitting components for a make-one-ship-one process. Cells have been moved between production buildings in Brillion; all walk-behind products are in one facility and ride-on products in the other. The focus of lean improvements is to continue to build to order, and to better level load the factories. Improvements in factory floor space and additions of office space have enabled all functions that support each business to be co-located with production.

Workforce. In the last 2 years, as base business has increased, Ariens added an additional 50 full-time plant-floor workers to its three plants in Brillion. Now, the Brillion hourly workforce is up to 650 people. Their goal is to employ people to meet their stable business demand. Ariens still hires temporary employees for peak demand periods, and employed up to 400 additional workers for these periods. They have not had a layoff for many years, and have gained a reputation that if you are in a fulltime position at Ariens, you can be assured that you will be there for some time. The productivity improvement goals of 12% annually have largely been accomplished, although it was 8% in 2008 because there was not the business growth that had been expected. Further, the lean intern program that had started when the case was written has continued to be supported and expanded. Over 10% of the Brillion workforce, in both production and administrative functions, has completed lean internships.

Business Growth. What allows Ariens to maintain employment and improve productivity and quality is growing its revenue. Some growth has come from its existing approach – selling more through its existing dealer networks – but this growth has been less than hoped for. Ariens has worked with and "challenged" its dealer networks to sell more, but more customers are buying from big-box retailers. Although it has declined these opportunities in the past, Ariens is expanding its relationship with Home Depot to sell a line of its products.

Ariens has also grown by acquisition, extending its business in new markets, spares, suppliers, and distribution channel. Access to new markets (turf renovation and reel mowers for golf and sports turf) comes from the 2006 acquisitions of Locke Turf (Opp, Alabama) and National Mower (St. Paul, Minnesota). In the past years, Ariens has sold its products overseas, and its acquisition of Bynorm in 2006 gave it four locations in Australia. In 2007, Ariens moved rapidly to acquire one of its suppliers, Auburn Consolidated Industries, from receivership. The purchase created a capacity to manufacture for OEM business from John Deere, Case New Holland, LESCO, and others. In 2008, Ariens purchased J. Thomas, a Michigan-based catalogue and Internet retailer of replacement parts for commercial turf and snow equipment.

Summary

What has changed more dramatically than Ariens' lean transformation efforts and strategy has been the economic conditions. Does Ariens' approach hold up under these conditions? Over the last 4 years, the business conditions have been difficult: an uncertain economy, product saturation, and low

barriers to entry have put the lawn and garden products industries in decline. The housing markets, including resale, are a trigger for people buying new lawn care and snow removal equipment. When people do buy, more buy down today, meaning that they no longer purchase the biggest, full-featured product but buy targeted on just what they need. High energy prices, and increasing costs of steel and raw materials, along with customers not willing to pay more, have hurt their margins. The additions of specialized turf equipment and parts businesses have helped overall margins. Financial conditions have hurt their dealers who depend on retail credit.

Ariens, because of its dealer distribution and funding of floor inventory, is doing better than its competitors in selling through to customers. Ariens' brands and associated quality reputation are known, which help them over unknown competitors in selling through dealers to customers. Ariens is working hard to contain costs and preserve employment. Through its process focus, waste-elimination, and workforce-empowering dimensions, lean helps Ariens to focus on what the customer needs. They have learned a "build-to-order philosophy," which results in cleaner factories and channels, as well as less raw material, work-in-process, and finished goods inventory. Nonetheless, for Ariens, the results have been less growth in revenue and lower profits than anticipated.

How does Ariens' management see its future under the current difficult business conditions? These are difficult conditions, they have hurt their business, but less so than if they had not made lean improvements. "Today," says Todd Swanson, VP of Administration at Ariens, "we feel that our fundamentals are there, lean is part of the culture, everybody thinks it is how we do business. We are in a position to sustain that thinking and producing."

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Notes

[1]A previous version of the case was presented and published in the proceedings of the CASE Association annual conference on 16 May 2007 in New Brunswick, NJ.

[2]"Kaizen" is a Japanese term meaning gradual improvement by doing little things better and setting and achieving increasingly higher standards. This definition is from Rooney and Rooney (2005).

[3]Ariens is a privately held company and does not publicly release financial and operational information. The metrics in this graph are taken from internal reports and normalized on 1999 levels. They show significant financial and operational performance improvement in the 5 years that lean transformation has been underway.

[4]Supermarkets are the storage locations of parts before they go on to the next operation. Supermarkets are managed by predetermined maximum and minimum inventory levels. Each item in the plant is at a designated location (Rooney and Rooney, 2005).

[5]See Womack and Jones (1996), Murman *et al.* (2002), and Liker (2004) for ideas extending from lean in production settings.

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Appendix

Financial and operating results

As a privately held company, Ariens does not publicly report financial and operational results. While we have had access to these data to confirm that their lean efforts have produced results at organizational levels, we are not able to provide any of these details. Ariens did not share with us its financial records from the time before Dan Ariens took the helm and therefore these data are not included in the analysis, either. The normalized comparison of performance measures (see Figure 2 in case) used Ariens' data to show the relative improvement results. These results were consistent, in timing and magnitude, with what was described in interviews with executives.

We also undertook a comparison of Ariens' results relative to firms that made products similar to what Ariens produced. We used data that were publicly reported from large corporations. Both of the comparison companies, which Ariens' management asked us not to name, were orders of magnitude larger. Hence, the comparison also includes other businesses which have much larger product lines. Again, respecting Ariens' management's wishes, we are not reporting absolute or relative numbers, although the numbers were used in our analysis. What we found was quite interesting.

In the 1999–2005 period, Ariens improved more than the two large companies did. In part, that rate of improvement was due to Ariens' profitability being lower than these other companies in 1999. In 2004, Ariens' profit margins were on par with these larger competitors. With the investments Ariens made in its facilities, development of its dealer relationships, and ongoing improvement efforts, we expect Ariens' results to exceed those of these larger companies in future years.

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