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Digital Transformation and the Role of Lean in Services
by Sara Hanks

Sara launched her career 22 years ago as a mechanical engineer but shifted quickly into continuous improvement when I became a Lean Six Sigma Black Belt. Early on, she learned the value that could be extracted from data and the importance of digitally collecting that data. After several years in manufacturing, Sarah transitioned to leading programs and teams to do Digital Transformation. Eventually, she was promoted to the Senior Director of Data Analytics, leading a team of data scientists, gaining firsthand experience with machine learning and artificial intelligence. Currently, she is the Director of Continuous Improvement at Wabtec Corporation, a supplier in the Rail and Mining Equipment industries.

Sarah enjoys bringing joy into the workforce by solving a problem, creating user friendly digital products, or providing easy access to data. In 2020, she launched Leverage 4 Data to provide a platform to do all three – create a solution to digitize workflows with an intuitive user interface and accessible data.

A couple of weeks ago, my husband and I decided to go to an Italian chain restaurant for dinner. We hadn't been there in years, and I was craving their salad dressing. After we were seated, I was surprised to see a touchscreen monitor in the middle of the table. With curiosity, I started hitting buttons and realized that this was the menu. We could order directly from our table without a server. Sort of. Except that I couldn't order a bottle of wine, nor could I customize my dinner order. I called the only server, who was extremely busy helping other customers struggling with the digital order system, to place my order. I doubt I'll be back, especially since I can replicate their salad easily with their bottled dressing.

This is an example of a failed digital transformation and a perfect example of implementing technology for the sake of implementing technology. Before jumping into a digital transformation in services, it is important to go back to the basics with the 5 lean principles.

Getting Started with Lean

Define Value

Value is simply what the customer is willing to pay for. In the restaurant example the value is the overpriced bottle of wine and the customized food order. In the equipment service business, the value could include maintenance of equipment, installing upgrades, performing diagnostics of equipment that is underperforming and completing the repairs to fix them. The value is also the time it takes for the service to be completed and the quality of the work. Perhaps the value is not offered yet but is part of the company strategy to introduce later. I recommend validating that the customers will purchase the new offering before proceeding to the next step.

Map the Value Stream

Mapping the value stream is laying out steps required to deliver the value to the customer, from the beginning of the process. The value stream includes the flow of material and information through the from one point to the next through delivery and cash collection. In services, the value stream includes the work completed in the service event and the supporting processes to accomplish the work. For example, procuring parts, the billing process to collect cash, and performing maintenance on internal equipment used to complete the service event are part of the value stream.

There are two types of value stream maps: the current state and the desired future state. Start with mapping the current state and evaluating it for improvement opportunities. Remove steps that don't add to the value creation. Afterwards, evaluate the process for waste

elimination opportunities. The desired future state is the new value stream after the unnecessary steps and waste items have been eliminated. Sometimes the current process needs an overhaul. In this case, the desired future state can be created from a clean sheet of paper. For more information on process improvement, see the Fall 2022 Business Newsletter.

Establish Flow

Flow exists when materials and information move through the value stream with minimal bottlenecks, interruptions, and delays. In high volume manufacturing, flow is easier to picture. Think of work moving from one workstation to the next in a predetermined time interval. In services, the work is much less predictable. There may be a sudden wave of heavy repairs, for example. Flow in services is achieved by focusing on reducing bottlenecks, interruptions, and delays.

A good place to start is with "5 S"

1) Sort – keep things that are needed to complete the service separate from unnecessary materials

2) Set in Order – organize the tools, parts, and manuals so that they are easily accessible

3) Shine – keep the area clean

4) Standardize – put items back where they belong and clean on a schedule

5) Sustain – discipline to keep following the other 4 S's

5 S helps technicians eliminate wasted time looking for tools or parts. 5 S applies with information too. Customer and OEM information should be readily available without requiring a research project. Digital transformation can facilitate waste elimination of information.

Another opportunity to create flow in services is to create material kits for standard service events, such as planned maintenance. By creating a kit ahead of time, it is easy to identify material shortages and make sure that every part is accounted for. Cross training people is another way to eliminate bottlenecks in the process. When multiple people can complete the same service, then when there is a flood of similar work in the shop you avoid the bottleneck.

Establish Pull

Pull exists when customer demand triggers action to happen in the value stream. In services, pull is inherent in the process already. Equipment maintenance and repairs happen when the equipment is made available. Pull is often used to minimize inventory by ordering parts from suppliers as they are needed rather than keeping inventory. Based on the supply chain disruptions in the last 2-3 years, I don't recommend an aggressive just in time inventory implementation. The customer dissatisfaction associated with longer repairs is not worth it.

Continuing to Improve

Continuing to improve is about creating a culture of continuous improvement. There is no one and done in lean. Every time an improvement is implemented, a new baseline is set and the tolerance for waste decreases. Too often I have seen continuous improvement stop after a digital transformation project is complete. There will always be new opportunities to streamline the operation further.

Now Let's Talk Digital Transformation

Digitizing the Value Stream

Digital transformation includes a wide range of solutions, from software to cloud data lakes, artificial intelligence to edge devices. It can be overwhelming to get started, so it is best to start with the value stream. To deliver services to the customer in the most efficient way, software systems should be used to pass information along the value stream.

There is a plethora of enterprise software on the market that can assist with digitizing the value stream. Here are some common solutions for equipment services:

Asset Management Software – this is software to manage internal assets such as welding equipment, CNC machines, or other capital investments. It includes the information about the equipment, the preventive maintenance schedule and workorder details. Asset management software could be used as a service to your customers as well, as a place to maintain information about their equipment, including repair history. Perhaps it could be a new revenue stream.

Customer Relationship Management (CRM) – manages the relationships and interactions with existing customers as well as potential future customers. All the relevant customer information is in one place, so they don't have to repeat themselves. Additionally, the CRM can be used to automate tasks driving further efficiencies.

Enterprise Resource Planning system (ERP) – a centralized software that manages an organizations day-to-day business activity, such as accounting, finance, procurement, project management, supply chain, and operations.

Field Services Software – Schedules and manages work when the technicians are completing the service on the customer's site as opposed to a service shop.

Repair Shop Software – this is a digital version of a workorder. It tracks what work is done on a piece of equipment, who did that work, and any parts that were replaced. Some solutions come with SMS text messaging, so you can send real-time updates to customers. Think domino's pizza app.

Supplier Management Software – if vendor communication includes information beyond a purchase order, then a supplier management software solution may be useful. If specific repairs are conducted by 3rd parties and the data is needed, this type of software is helpful.

My suggestion is to prioritize solutions that will address areas in the value stream with the most waste related to information first. If you have some of these solutions already, I recommend looking into apps that supplement existing software to seamlessly integrate the solutions.

For smaller service shops, there are several options that include features from each of these enterprise systems in one package.

There are three benefits to software implementation:

1) Moving information through a system reduces waste in the process and improves productivity. I've seen as much as a 30% improvement in cycle time and a 25% improvement in cost of quality in my projects.

2) Operations teams can visualize the status of work and act on any issues sooner. It's common in lean to implement a Gemba board and discuss the status of the operation at the

board. Typically, this is managed using printed paper and magnets. If the data is captured digitally, preparing for the Gemba meeting becomes simple.

3) Collecting time stamps of events makes continuous improvement easier. By looking at the data, the teams can easily spot bottlenecks and seek to find improvement opportunities.

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Digital Transformation Beyond Software

When the basic flow of information in the value stream is captured digitally, other advanced technologies can be explored to further improve the operations or enhance the customer experience.

Augmented Reality

When Google produced the Google Glasses, many people thought that it would solve a major issue facing companies: the reducing population of skilled workers. By putting the instructions into the glasses, an operator can be taught how to do specific tasks on the fly. The challenge with this thinking is that the instructions need to be created and maintained in the first place, which is more time consuming than the benefits. I have seen augmented reality work well with remote assistance. When a technician was troubleshooting an engine, an engineer could see what was happening on the engine and assist the technician. The technician could communicate just like a cell phone, but it was hands free. Even the inspection equipment integrated with the glasses, sending data over the interwebs to the engineer.

Chatbots

Chatbots are conversational forms of artificial intelligence. It's not uncommon for customer facing websites to include a chatbot to answer basic questions and direct the customer to the right agent when they are available to act. When starting with a chatbot, it is best to start small, with pre-defined answers. Eventually, artificial intelligence can be used to interpret the question and learn from historic conversations.

Additive Manufacturing

Additive manufacturing uses 3D CAD models to construct precise physical objects one layer at a time. In the equipment services industry, additive manufacturing could be used to create a rare replacement part. Additive repair processes can be used to add material back to an existing part. While these technologies are very new, many universities such as the Rochester Institute of Technology are researching these solutions for sustainability purposes.

Closing Thoughts and Tips

Before wrapping up, I'd like to share a few tips that I've learned over the years.

- ✓ Engaging the front-line workforce in the entire journey is key. The technicians and office personnel understand the problems the best and should be part of developing the solutions.

- ✓ Technology will have issues, so it is important to prepare for issue management as part of the project. For example, if you're implementing a portable CMM, who will be responsible for fixing it, should it fail.

- ✓ Create a robust feedback loop and change management system. Even in a simple project, there will be requests for improvements or enhancements. Creating a mechanism to collect the feedback and evaluate the change will help build trust and transparency. Just be sure to close the loop, even if the change request is denied.

According to an article by Harvard Business Review, in 2018 $900B of the $1.3T invested in digital transformation was wasted. By taking a lean approach and continuing to emphasize the importance of the people, the chances of success increase significantly.

Learning Without Scars

As a third-generation educator, it is easy to say that teaching and training are in the blood for Ron Slee. From his beginnings as a coach, through his time at McGill University, Ron developed a foundation for the work he does today.

Learning Without Scars provides comprehensive online learning programs for employees starting with an individualized skills assessment. These assessments allow us to then create a personalized employee development program. From their assessed skills, the employee is asked to select from classes designed for their skill level which allow them to address the gaps in their knowledge level. This allows the employees to move through four progressive categories of learning: Basic, Intermediate, Advanced and Expert.

Class References

Service Organization
Work Order Process
Shop Floor Scheduling

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What country was it built in?**

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