Teaching Note for:
Bespoke Analytics at Lie-Nielsen Toolworks

Teaching Note

Overview

Lie-Nielsen Toolworks (LNT) is a small, family-owned company engaged in manufacturing very high quality products in a rural area. Due to their location far from major labor markets, and the knowledge-intensive nature of their manufacturing processes, they struggle to hire, develop, and retain the human resources they need. Having seen rapid growth in demand over the past several years, they haven’t been doing well at forecasting demand and planning production. They have tended to plan production jobs in reaction to stock-outs rather than anticipating them, and now have a large backlog of backorders.

Having reorganized the factory layout and upgraded its CNC machines over the past two years, LNT is now turning to information systems and analytics as tools for improvement. They have partnered with Fulfil.io, an implementer of the open-source ERP platform Tryton, to customize an ERP system to their business. Fulfil’s CEO is a strong believer in a collaboration, through APIs, between an offshore ERP developer (his company) and an internal IT team (at LNT).

Lie-Nielsen is building up an internal IT department to develop analytics reports and dashboards; these pull data via an API from Fulfil’s backend. Their philosophy regarding analytics is to provide “visibility” rather than impose a process, as they believe this is a better fit to their knowledge-intensive and often non-routine way of working.

Themes

open-source software; ERP; custom-built dashboards; use of APIs in analytics development; outsourcing; partnership between offshore and internal IT; family-owned business; manufacturing; human resources

Major questions for classroom debate

1. Should this company use information systems to impose a disciplined workflow for manufacturing, or alternatively, use analytics for to give workers “visibility” and empower them to make their own decisions flexibly?

   LNT’s current analytics initiative is geared toward the latter (see p. 12), however, both Tom and Robin seemed to lament the lack of process discipline and wish for more structured workflows (see p. 6). Students may discuss whether this “visibility” idea is a good strategy in general, a good strategy just for this company, or a bad strategy in general. Lean manufacturing may be linked to this question, as it purports to empower workers and simplify the workflow at the same time.

2. What business or process changes could help LNT to get the most out of analytics?

   Students should be encouraged to go beyond simply considering KPIs and dashboard design for this case. LNT faces a number of challenges in its manufacturing function: a large variety of products, selling in relatively small quantities, with lots of machine setup time needed between batches. They have considered and partially adopted Lean manufacturing. Tom frequently intervenes directly in the factory, possibly creating a dependence upon him among some workers. Human resources are a perennial challenge for LNT. Students should be encouraged to consider business policies for improving the situation, rather than just IT policies. Then they should be urged to consider combined business-IT initiatives. For example, what would going to a Kanban system imply for the use of analytics?
Usage Suggestions

The case is suitable for undergraduate as well as graduate business teaching.

I have used this case as the first reading in an Introduction to MIS course for undergraduates, to make the points that information technology must “fit” a particular business, and is hence a business concern rather than a purely IT concern. A quote by marketing director Robin Nolan that “the disconnect between the IT department and the end user is so huge it can be greatly benefited by a translator” (page 12) helps explain to students why understanding information systems is important to them.

The case would be a valuable addition to an MBA course in business analytics or information systems as it provides a contrast to other cases set in larger organizations with more formalized processes and automation. LNT’s shortage of talent, and frequent non-routine work, throws a monkey wrench into the works of traditional ERP. Interesting discussions could be had about whether LNT’s thinking about ERP and analytics is really correct, or if they’re merely rationalizing poor process discipline.

Additionally, because the case touches on manufacturing, it might be a good case study for a class that has learned a bit about Lean manufacturing, just-in-time production, total quality management, and related theories like the theory of constraints (aka “bottleneck theory”) of Eliyahu Goldratt. With a bit of that background, students might read the Lie-Nielsen Toolworks case as a discussion of how analytics and software should be used to facilitate operations management. Analytics in a “pull” production system, for example, might differ from analytics in a traditional “push” system.

Futhermore, the case introduces the concept of APIs. Sharoon Thomas of Fulfil.io proposes that APIs make the offshore and internal IT teams partners rather than competitors. An instructor might challenge students to decide whether they’d prefer an ERP system which was itself customizable, versus an API-enabled ERP that allows them to build separate tools. The answer to which is best probably depends upon the skills available in the internal IT team and the variety of custom views they want.