

The Value of Digitizing Manufacturing Environments

**Stanley
Black &
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BUSINESS PROBLEM

The company is attempting to drive operational improvements to the flow and processes within sites by investing in digital and connected factory (Industrial Internet of Things) technology. The goal is to improve the fundamental operating systems and capabilities for lean and continuous improvement. The team requires a method to quantify the value generated from the implementation of digital tools in the manufacturing environment. The approach must be applicable to the large portfolio of digital tools employed and variety of production environments at SBD (100+ sites, 150k+ SKUs, 50k+ employees).

DATA SOURCES

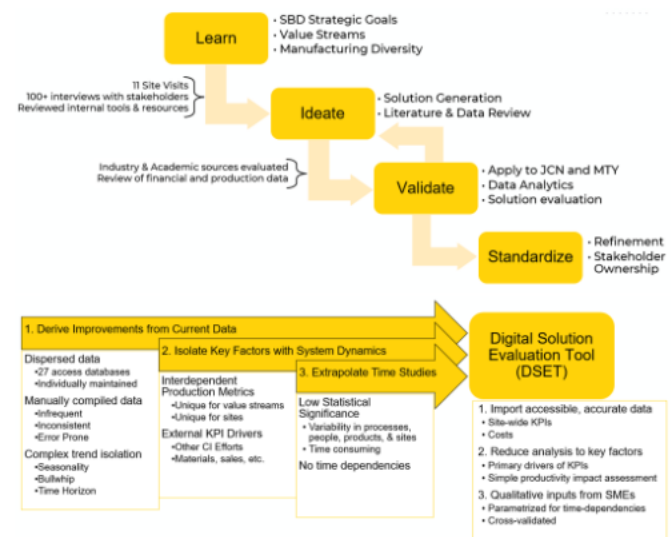
Data sources included legacy productivity databases and financial reporting spreadsheets derived from SAP. Qualitative inputs came from interviews with subject matter experts, cross-validated with time studies and alternate sources. Production data derived from the new digital tools became available later in the project.

Data Types and Format

Data was tabulated in a combination of Excel tables, Access databases, Grafana dashboards, and Snowflake repositories. The productivity data was compiled into time series of KPIs.

APPROACH

A system dynamics model analyzed the production environments and identified key factors that strongly correlated with the potency of the delivered digital solution. A simple, accessible, and repeatable Excel based Digital Solution Evaluation Tool (DSET) was built to qualitatively assess these factors through selective analysis of available data and numerous interviews with subject matter experts.



IMPACT

The digital transformation effort at SBD is capital-intensive and requires justification for continued investment while the manufacturing leadership needs to understand the risks and opportunities of the technology embedded into critical processes. Additionally, major problems occur during implementation of digitization efforts without monitoring systems to assess progress. By quantifying the value generation and costs from this digital push, SBD can optimize the delivered solution for each site and value stream. These solutions generate different ROI depending on the application, so mapping best practices and guiding the development and deployment strategy will dramatically improve the chance of success for this digital transformation at SBD. Unfortunately, there is currently no industry approved method for calculating the value created by digitizing manufacturing environments which prevents presenting a business case through a traditional approach. The wide spectrum of manufacturing environments, variety of digital tools, and dependency of results on time, culture, and people cause assessments to be ephemeral. Therefore, assessment workload will be inversely correlated with the applicability towards strategic insights. If it sacrifices efficiency for extremely precise results, those results will be incorrect by the time the assessment is complete and the assessment will be done infrequently, limiting the impact on digital strategy.

DRIVERS

Despite the long years of success as a company, SBD is in transition. Recent years of leadership challenges and supply chain bullwhip from the COVID-19 pandemic hit SBD particularly hard. To counteract those challenges, SBD has been focused heavily on supply chain optimization through operational excellence initiatives, site consolidation, and supply chain localization (partially due to changing tariff policies).

BARRIERS

Due to the size, diversity, and frequent acquisitions, there is significant variety in the people, products, and processes across the company. Additionally, the matrix structure encourages individual sites to tailor processes to the unique products they produce while generalized functional teams seek standardized solutions that apply across the company. A previous digital transformation attempt left sites opposed to new digitization efforts.

ENABLERS

Strong support from site digital champions was a major part of the project success. These individuals supported the effort and connected the team to pivotal manufacturing team members. Another factor was SBD leadership embracing rapid decision making and understanding that decisions often must be made from imperfect information. This enabled the team to act with speed to meet business needs.

ACTIONS



The productivity data was analyzed, and the production environments were mapped to a system dynamics model to identify causal relationships. Concurrently, the costs of implementing the digital solutions were tabulated for each of the stakeholders. A tool was built that compiled costs, immediate improvements, long-term productivity impacts, and positive externalities to assess financial performance of delivered solutions.

INNOVATION

The differentiating factor of the project was the adaptability to diverse digital solutions in various environments. The tool targets key factors identified from the system dynamics model for efficiency and flexibility. Time-dependent results are fit to generalized learning curve shapes and adjusted with risk factors. The tool also emphasizes transparency to achieve accessibility for all stakeholders, prioritizing straight-forward methodologies.

IMPROVEMENT

Direct impact from the tool usage has not been measured at this time. However, during development of the tool, various opportunities were identified and executed including 14% improvement to training efficacy and 7% improvement to labor efficiency for some value streams. Opportunities identified during the project and planned for execution in 2026 could achieve an additional \$6.1M (2.9M risk adjusted) in savings per site deployment.

BEST PRACTICES

The digital transformation team developed an assessment procedure to evaluate value from different digital solutions at different sites. Taking an accurate baseline initially would enable more accurate accounting of solution performance. Implementation must be properly executed, focusing on areas with larger relative impacts such as inventory, attainment, and labor efficiency while strategically prioritizing the order of asset connection.

OTHER APPLICATIONS

The methodology and approach for this tool, while designed for digital tools in manufacturing environments, could be adapted to other strategic initiatives around productivity improvements. It could also be integrated into the initial assessment process for future digital tool deployments. Due to the inherent flexibility in the tool, applications could be found in other industries and manufacturing environments.