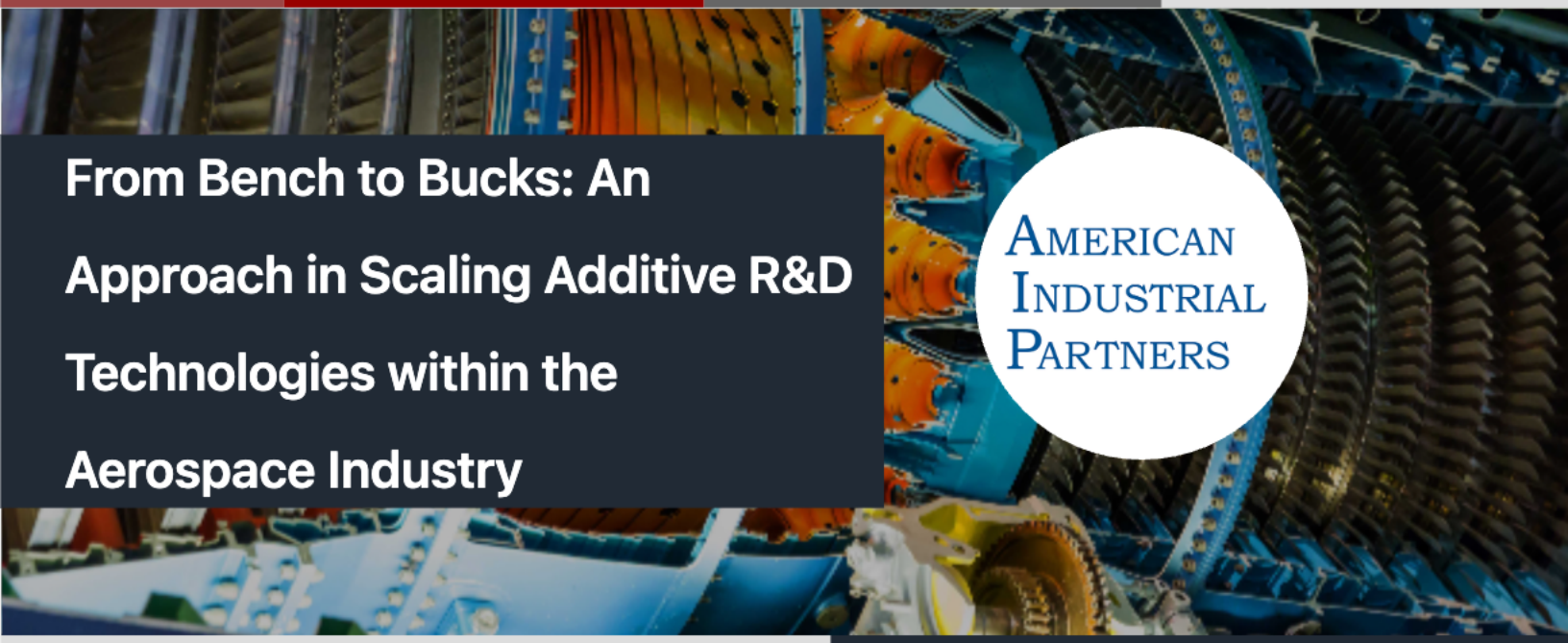
From Bench to Bucks: An Approach in Scaling Additive R&D Technologies within the Aerospace Industry



American Industrial Partners

BUSINESS PROBLEM

Scaling technology-focused companies is a unique challenge, as taking cutting-edge technology from the lab to consumer markets often requires significant R&D work in parallel with all the typical challenges that any start-up faces. This thesis explores a new scaling framework (the "HHOQ Scaling Framework") through the lens of Wingate, a technology-centered company in additive manufacturing focusing on material development and printing of high-temperature metals. Wingate had notably strong customer relationships and a technically superior product to competitors, and is facing the challenge of rapidly scaling operations to meet customer demand.

APPROACH

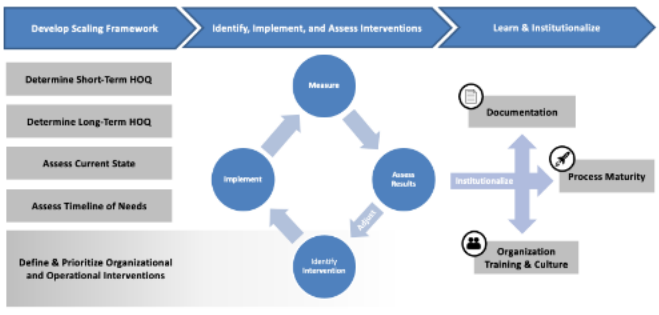
The scaling framework is centered on a tool called the House of Quality (HOQ), which is designed to help prioritized design features of consumer products. By defining a Holistic House of Quality (HHOQ) that includes company-wide capabilities and auxiliary functions, and applying HHOQs to company growth, the research explores whether HHOQs can help guide scaling decisions for companies.

DATA SOURCES

Historical data sources at Wingate are slim. Offline excel files show customer backlog and quoting estimates. A Quickbooks account that details past invoicing, although it has already been confirmed that invoicing cannot be reliably tied to production. Data will need to be gathered through activity value stream mapping, interviews, and creating processes to begin collecting information on KPIs.

Data Types and Format

Data is contained in offline and online excel spreadsheets, and the web-based Quickbooks portal. Many documents are located in a common shared folder drive for the company.



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IMPACT

Successful implementation of the scaling framework could lead to massive growth of Wingate in areas like operations, customer sales, facilities upgrades, and other areas. This scaling has the potential to increase revenues from ~$2M to ~$8M over the next 5 years, and provide exceptional service to customers to help them achieve their goals in aerospace and other industries.

DRIVERS

Additive manufacturing, especially within aerospace, is a rapidly growing industry with healthy customer demand. This ripe industry gives Wingate high growth potential to grow their top line revenue, and therefore high priority to invest money, resources, and time into their growth. Since the potential returns were high, it meant leadership support was there for the project.

BARRIERS

Primary barriers for this project included limited historical data sources, limited personnel headcount at the start-up to implement processes or data collection, and over the next 5 years, and provide the short timeframe for the research.

ENABLERS

The small organization allowed new processes to be implemented quickly and then adjusted with feedback. Leadership was open-minded and supportive of changes, and the rapid growth of the company meant that additional operations resources and changes to improve efficiency were welcomed.

ACTIONS

To implement this solution, I followed the HHOQ scaling framework: I performed a current state assessment (value-stream mapping) on the company's operations, interviewed customers to establish short-term and long-term HHOQs, identified and prioritized changes we wanted to make, and then implemented these changes at the company to see how they would impact operations.

INNOVATION

This research presents a new tool called the Holistic House Of Quality(HHOQ), and a new scaling framework utilizing this tool called the HHOQ Scaling Framework. The HHOQ builds off of the already-known House of Quality used in industry, and expands it to consider decisions and trade-offs at a company level to best serve customer needs.

IMPROVEMENT

During the timeframe of the research, Wingate grew headcount from 4 employees to 10 employees, reduced overdue customer backlog by 46% and increased on-time delivery by 15%. The HHOQ framework proved useful in providing a structured way to assess scaling efforts in relation to customer needs, and successfully painted a picture of what other auxiliary functions would be important besides the success of the technology itself.

BEST PRACTICES

Best practices include getting management buy-in for the framework, performing in-depth customer interviews to inform the HHOQ tools, thinking through interventions at a systems level to decide when and how to implement them, and focusing on institutionalizing successful interventions.

OTHER APPLICATIONS

This thesis is anticipated to be a starting point for more wide-spread consideration of HHOQs as a tool in scaling decisions, including the effectiveness of the framework over longer time horizons and across various industries.