Hope Ascended Healthcare

Outsourcing vs Insourcing Hospital Laboratory Services

In 2022, Hope Ascended Healthcare (HAH) was approached by several reference laboratories about acquiring HAH's clinical and anatomical pathology laboratory testing. The proposals were organized into two scenarios: 1. HAH partners with a vendor (i.e. Labcorp, Quest, Mayo, Sonic, etc.) to sell off all outreach services and consolidate their send out laboratory testing, and 2. HAH sells all laboratory assets and partners with a vendor to be an in-house laboratory expert.

Sell Outreach and Consolidate Reference Testing

Hospital outreach laboratory testing was brought about as the healthcare market recognized that neighboring physician practices and organizations were sending their work out of the community to reference laboratories rather than utilizing their local hospital resources[1]. To improve turnaround times and relationships within communities, independent and employed physicians began to turn their attention towards hospital laboratories. Today, hospitals perform over 52 percent of all labs within the U.S[2].

The debate between healthcare organizations is whether to keep outreach laboratory services or to sell them off for quick cash. A major consideration for doing this is the challenging financial performances hospitals have experienced since COVID-19. In 2023, 79 hospitals with over $500 million in liabilities filed Chapter 11 bankruptcy. What's more alarming is that over the last 4 years, this number has only increased exponentially[3]. Selling off a laboratory outreach program can mean several millions of dollars in cash for a hospital, which can be used to reinvest in more profitable services like surgery.

However, selling an outreach program can also bring hardships. While cash is important for any business, over time a hospital's laboratory cost per test ratio will increase because of lower volume counts. This is feared to increase inpatient stay costs. Some hospitals end up bringing back their outreach program after finding that quality, service, and financial performances suffered because of outsourcing[4].

Sell All Laboratory Assets and Partner with Reference Lab

Some health systems see the benefits of entering a true partnership with subject matter experts. Rather than selling part of their services, why not outsource all to a company whose core business model specializes in said services? In 2021, Ascension, Sutter, Basett, Baptist Health South Florida, and Baylor Scott & White all laid off and

outsourced their IT resources as a means of reducing costs and improving specialized services[5]. In 2023, Baystate Health sold its lab assets to Labcorp for an undisclosed amount[6]. Why sell off all service-line assets? By outsourcing all resources, a company completely relieves themselves of any future financial investments into said service line, the headaches of day-to-day operational management, and the wasteful practices often associated with companies who rely on "home grown" solutions that fail to meet industry leading approaches or technology. Additionally, outsourcing a service theoretically pools volume from other health systems and providers allowing the vendor to leverage additional economies of scale, which in turn, translates to savings that can be passed along to customers.

However, the same challenges to selling off outreach assets remain with selling off an entire service line. Despite theoretical or anticipated savings, over time, costs can sometimes increase while quality and service suffer. In the end, is it worth it to sell off assets only to risk having to reinvest within a decade?

About Hope Ascended Healthcare's Laboratory

HAH is a fictitious multi-state hospital system, totaling 101 licensed laboratories across the following locations: Alabama, District of Columbia, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Maryland, Michigan, Mississippi, New York, Oklahoma, Tennessee, Texas, and Wisconsin. Although the names and some sensitive information from these organizations have been changed or modified to protect entities and individuals, the facts of the case are based on real events that have taken place across the nation.

The laboratory is overseen by territory VPs, whom all report to HAH's Executive Vice President, Dr. Clare Fiore, whose team is outlined below:

Name, Title	Market
Jose Garcia	Alabama, Mississippi, and Tennessee
Joanna Gates	Texas and Oklahoma
Frank Capola	Illinois, Kentucky, Wisconsin
Justin Grow	Maryland
Stacey Nikolajni	Kansas, Indiana, Michigan
Timothy Cooper	Florida and Georgia
Dr. Julie Salvanna	District of Columbia and New York

Dr. Fiore is a former primary care physician by trade, turned administrator. She and Mr. Garcia studied at the same undergraduate college and know many of the same professors. They share a unique relationship, having worked closely together for over a

decade now. Mr. Garcia continues to be a long-time supporter of Dr. Fiore and will often do what is asked of her. However, his relationships with his teams and partners are second to none. He's often perceived as a "Father" to many in the lab. Mr. Garcia takes care of his people so they can focus on providing lab services. He's heavily influenced by trends and making sure he stays in the spotlight.

Mrs. Gates has been with HAH her entire 20-year career. She prides herself on this fact and is the only member of the team with historical knowledge of the system. Dr. Fiore has used her many times to help understand context and traditions within the system. Mrs. Gates is a high energy leader, often pushing her teams to dream big and pursue their ambitions. She is a great public figure and has used these strengths to grow her outreach business well. Few doctors in Texas and Oklahoma don't know of Mrs. Gates and her willingness to "get it done" as the physician community puts it.

Mr. Capola is a little rough around the edges, but he respects Dr. Fiore. His upbringing has taught him to be direct, trust no one, and question everything. On more than one occasion his team members have quit, accusing him of being a "control freak" and unprofessional during meetings. It's true that he sometimes gets distracted, but he's also one of the most productive leaders that Dr. Fiore has on her team. His determination to succeed is second to none, although Dr. Fiore has questioned some of his decision-making tactics. Mr. Capola is incredibly competitive and battles Chicago politics well. He tends to let his trusted leaders handle Kentucky and Wisconsin on their own unless he feels he needs to take part in something that he believes is important. What we do know about Kentucky is that their staff have some of the longest tenured employees within HAH. In Wisconsin, there appears to be normal turnover. From exit interviews, many complain about leaving due to disagreement on roles and day-to-day responsibilities.

Mr. Grow is a young administrator. With only four years of professional experience since graduating from a prestigious university, he has been labelled as young, enthusiastic, and hungry for any challenge. Dr. Fiore inherited him from the Maryland market's system CEO. HAH sees Mr. Grow as a leader worth developing. Dr. Fiore sees Mr. Grow as behaving somewhat overconfident, quick to make decisions, and the system's "golden child" when it comes to future planning. Mr. Grow is well liked within his market, so Dr. Fiore tolerates behaviors that she labels and documents as "to be developed" in Mr. Grow's end-of-year evaluation. Dr. Fiore has little patience with Mr. Grow's lack of experience and due diligence, but she must tolerate it due to system politics. Mr. Grow tends to be influenced by his mentors and those who have promoted him over Dr. Fiore's influence. His decision making has been somewhat random, trusting his "gut" over sound data and innovative thinking. He tends to do what his team wants, or he thinks they need, and he is resistant to

combat hospital presidents. On more than one occasion, he's asked for Dr. Fiore to share the more complicated messages, claiming that he would like more experience and to learn from her. Dr. Fiore believes that he will continue to struggle to be anything but a puppet controlled by his mentor.

Ms. Nikolajni's background is not in lab, but with insurance and managing large Accountable Care Organization (ACO) markets. She joined HAH originally to manage their insurance plans but decided to change her career path and move into operations. Many have accused her of being career driven, but she is more known for being a book worm. She loves to get into the details of every contract, requirement, and outcome. She's not afraid to go toe-to-toe with corporate's supply chain team and other leaders on her contracts as they've burned her in the past with bad deals. She seems to rely heavily on outside consultants to help get initiatives done and understand the market trends. Ms. Nikolajni's messages continue to be focused on being a top performer and leading laboratory. Her goal of being the top performing market at HAH and across the nation is based on her understanding of current performance standards and benchmarking. Dr. Fiore finds her dedication to details helpful when she wants a change implemented.

Mr. Cooper is close to retirement. He is well liked in the system and in his market. He joined HAH two years ago and inherited a challenging market and is turning it around slowly. Dr. Fiore appreciates his leadership and relationship-building skills as it allows her to spend more of her time across all markets as opposed to frequently flying down south to fix public relationships and internal challenges. Mr. Cooper has made a career out of fixing problems, but because of this he rarely stays with any organization long enough to be promoted or rewarded for his short-term accomplishments. He prefers to fix one problem and then move to the next at his own pace and time as defined by benchmarks and peer comparison. He also has a team of contractors that he frequently partners with to solve problems and implement change. He does have a side business teaching at local universities and finds a passion in research.

Dr. Salvanna is a dual citizen and flies between her native country and the U.S. She prides herself on being the center of attention. She's quick to hire those who pledge close allegiance to her and her vision, even if she's wrong or there's a better option available. She sees the value in hiring close allies as it is easier to implement change and control behaviors. Recently, she has been hiring professionals with work visas. She has been accused of favoritism on multiple occasions and HR has had to assist Dr. Salvanna with several HR cases. She struggles with overcoming barriers to things she does not control but believes she is effective and leads HAH in performance standards and profitability. HAH capitalizes on Dr. Salvanna's public track record and frequently uses her political

successes as a means to market HAH's services and expertise. Dr. Fiore and Dr. Salvanna share a similar past as they are both physicians turned administrators, but Dr. Salvanna specialized in internal medicine before making an early career switch. It is rumored that they both believe physicians should be running health systems.

HAH's mission statement is "To Provide Industry Leading Care" with a vision statement to "Be the Preferred Provider of Choice in the Communities HAH Serves." However, each market executes these statements differently. HAH senior leadership recognizes that each market should operate at a level of professionalism and effectiveness that serves local needs while not compromising the HAH brand. It is clear to all market presidents that HAH corporate is profit conscientious in providing care. This sometimes conflicts with individual values on the front lines, especially in the New York market where numerous employee strikes have occurred. Battling unions in New York, Illinois, and Washington D.C. require many contractors be hired to fill in staffing gaps. Currently, New York is battling its worst strike due to the union claiming unfair staffing ratios and pay.

Application (Unit 1.0 – 1.1)

You are part of the project management office (PMO) at corporate. You recently acquired your Lean Six Sigma Yellow Belt Certification with Magnified Learning. Your boss, the Senior Director of HAH's PMO, has asked for your help in preparing some internal discussion around HAH's consideration of selling off lab assets. At Dr. Fiore's request, she would like for a select few from your department to review the current state of things in the lab. You will have access to whatever data you need, but you are not to engage with any lab leadership or front-line employees on the topic. Your boss asks you to put a plan together of how you would evaluate the current state of the lab within HAH.

Questions

1. What is the expected reaction from each market to selling off lab assets?
2. Regardless of which path to consider, what approaches should be used across each market to implement change?
    a. How would you rate the complexity of implementation across each market?
        i. Who is/are the most challenging? Why?
        ii. Who is/are the least challenging? Why?
3. Perform a stakeholder analysis and determine who might be a good candidate to champion change.
4. Prepare a three-minute report on the team's findings.

Application (Unit 1.2)

In evaluating whether to sell off assets starts with understanding the current performance of each market. Using logic and critical thinking, you will be asked to present your thoughts to your boss, who is looking for your help in organizing the facts of the situation.

Questions considered and shared by your boss are the following:

1. What is the health of each market from a finance, quality, and service perspective?
2. What performance standards must be maintained as part of the deal between vendors so that quality and services do not suffer?
3. What would happen if HAH considered a system-wide transformation? What is the benefit of reducing costs internally compared to selling part or all the lab business?

Vendors put proposals together based on the information shared by HAH. The information shared included volume count details by territory and location. This volume was divided into outreach and total volumes. As a result, each vendor has provided their proposal for acquiring the volume. This is provided in table 1 and 2.

HAH prides itself in utilizing system benchmarking to establish a standard VOB for all markets. However, each market president decides how best to hold service lines accountable for performances. These standards are provided below:

Facility Testing Size	Total Cost per Test			
	50th	25th	10th	Target
<100k	$23.11	$15.52	$12.92	$15
100k	$15.86	$13.25	$8.62	$13
250k	$13.38	$12.12	$9.25	$12
500k	$12.96	$11.17	$10.25	$11
1,000k	$15.60	$11.12	$7.35	$11
>2,000k	$15.80	$12.24	$6.52	$12

Table 1

	Outreach Selloff by Market				
	Vendor A	Vendor B	Vendor C	Vendor D	Vendor E
Alabama	$ 3,052,244.34	$ 2,581,690.00	$ 2,556,254.63	$ 2,670,713.80	$ 3,942,482.27
D.C.	$ 1,007,124.00	$ 851,859.05	$ 843,466.35	$ 881,233.50	$ 1,300,868.50
Florida	$ 37,910,484.00	$ 32,065,951.05	$ 31,750,030.35	$ 33,171,673.50	$ 48,967,708.50
Georgia	$ 23,020,517.48	$ 19,471,521.04	$ 19,279,683.39	$ 20,142,952.80	$ 29,734,835.08
Illinois	$ 2,436,636.00	$ 2,060,987.95	$ 2,040,682.65	$ 2,132,056.50	$ 3,147,321.50
Indiana	$ 28,343,676.00	$ 23,974,025.95	$ 23,737,828.65	$ 24,800,716.50	$ 36,610,581.50
Kansas	$ 6,621,552.00	$ 5,600,729.40	$ 5,545,549.80	$ 5,793,858.00	$ 8,552,838.00
Kentucky	$ -	$ -	$ -	$ -	$ -
Maryland	$ -	$ -	$ -	$ -	$ -
Michigan	$ 4,261,896.00	$ 3,604,853.70	$ 3,569,337.90	$ 3,729,159.00	$ 5,504,949.00
Mississippi	$ 2,009,580.00	$ 1,699,769.75	$ 1,683,023.25	$ 1,758,382.50	$ 2,595,707.50
New York	$ 21,118,392.00	$ 17,862,639.90	$ 17,686,653.30	$ 18,478,593.00	$ 27,277,923.00
Oklahoma	$ -	$ -	$ -	$ -	$ -
Tennessee	$ 6,594,245.40	$ 5,577,632.57	$ 5,522,680.52	$ 5,769,964.73	$ 8,517,566.98
Texas	$ 73,969,538.64	$ 62,565,901.43	$ 61,949,488.61	$ 64,723,346.31	$ 95,543,987.41
Wisconsin	$ 34,745,538.78	$ 29,388,934.88	$ 29,099,388.73	$ 30,402,346.43	$ 44,879,654.25
Total	**$ 245,091,424.64**	**$ 207,306,496.67**	**$ 205,264,068.14**	**$ 214,454,996.56**	**$ 316,576,423.49**

Table 2

	Total Lab Selloff by Market				
	Vendor A	Vendor B	Vendor C	Vendor D	Vendor E
Alabama	$ 18,704,723.30	$ 18,541,283.97	$ 17,796,727.02	$ 11,743,418.51	$ 13,317,278.72
D.C.	$ 12,195,890.07	$ 12,089,324.04	$ 11,603,856.57	$ 7,656,966.58	$ 8,683,157.98
Florida	$ 27,396,261.14	$ 27,156,876.34	$ 26,066,345.55	$ 17,200,241.62	$ 19,505,428.65
Georgia	$ 41,649,910.91	$ 41,285,979.65	$ 39,628,070.58	$ 26,149,135.01	$ 29,653,658.25
Illinois	$ 6,337,025.06	$ 6,281,652.99	$ 6,029,402.48	$ 3,978,585.31	$ 4,511,797.77
Indiana	$ 32,262,183.09	$ 31,980,280.51	$ 30,696,057.69	$ 20,255,221.74	$ 22,969,839.09
Kansas	$ 13,863,771.86	$ 13,742,632.11	$ 13,190,773.23	$ 8,704,115.67	$ 9,870,646.63
Kentucky	$ 13,149,418.96	$ 13,034,521.12	$ 12,511,097.65	$ 8,255,622.26	$ 9,362,045.86
Maryland	$ 39,788,763.62	$ 39,441,094.81	$ 37,857,270.24	$ 24,980,647.71	$ 28,328,569.57
Michigan	$ 6,694,465.97	$ 6,635,970.63	$ 6,369,491.89	$ 4,202,998.05	$ 4,766,286.45
Mississippi	$ 6,641,849.32	$ 6,583,813.75	$ 6,319,429.45	$ 4,169,963.65	$ 4,728,824.76
New York	$ 39,502,069.18	$ 39,156,905.47	$ 37,584,493.01	$ 24,800,651.85	$ 28,124,450.55
Oklahoma	$ 12,339,813.77	$ 12,231,990.16	$ 11,740,793.69	$ 7,747,326.45	$ 8,785,627.93
Tennessee	$ 13,222,848.76	$ 13,107,309.30	$ 12,580,962.90	$ 8,301,723.82	$ 9,414,325.98
Texas	$ 100,486,027.65	$ 99,607,994.40	$ 95,608,065.15	$ 63,088,315.10	$ 71,543,450.11
Wisconsin	$ 81,537,308.63	$ 80,824,846.71	$ 77,579,186.85	$ 51,191,708.33	$ 58,052,452.74
Total	**$ 465,772,331.28**	**$ 461,702,475.95**	**$ 443,162,023.93**	**$ 292,426,641.64**	**$ 331,617,841.04**

Your boss was able to acquire the last two years of performance data. Within this data there are twelve financial variables with actual and budgeted numbers.

Questions

1. Using the provided data from "Six Sigma Yield Calculations.xls", what would you communicate to your supervisor about current state performance of the laboratory using six sigma yields along with other appropriate and relevant performance metrics, analysis, and logic?
    a. What are the business values?
    b. What are the customer values?
    c. What are the cultural values?
    d. What are the decision-maker values?
2. What quality standards must be maintained or improved as part of the sell-off consideration?
3. What service standards must be maintained or improved as part of the sell-off consideration?
4. Should HAH consider performance improvement strategies over sell-off? Assume a 5-year contract commitment with each vendor.
5. Should HAH consider a hybrid approach to be more profit focused? Assume a 5-year contract commitment with each vendor.
    a. Which markets should be sold?
    b. Which markets should work on improvements?

Application Unit 1.3

Your boss has gathered more information on the potential waste occurring across markets. He would like you to help him organize the information gathered into a presentable table where waste can be quantified into three categories: Expense Reduction, Cost Avoidance, and Capacity Increase – Growth.

Using the following information as well as the data provided, organize and quantify waste into the three categories:

Waiting to get ahold of a lab professional is a problem for New York and Illinois. For outreach growth and sales, these markets must serve both hospital-employed physicians as well as independent practices. If lab staff do not answer the phone, then physicians send their work to another reference lab. Your boss has asked you to identify the potential opportunity for improvement. From a previous project, he estimates that for every facility satisfaction score below a 3 on Q3 of the VOC data set, there is a loss in revenue generation equal to three times the operating costs for outreach volume. Assuming every practice could increase market share by 10% with improved scores, calculate savings using a $4.50 average margin per test for each facility with a score below 3 on Q3 of the survey.

Overproduction occurs across HAH when extra tubes are drawn but then discarded without being used. The reasons for this practice are sometimes justified, but waste is waste, and the cost of discarding these tubes is estimated at $1.75 per discarded tube. This factors in the operating costs of the tube and cost of discarding biohazardous materials, as well as an estimated $0.25 cost in soft dollars from wasted labor, storage space, and time spent managing useless materials. Using "Discarded Tubes from the Service" tab data, calculate the potential waste in overproduction.

Rejects, or defects, occur in the lab when specimen samples are mishandled and made useless for testing. Like overproduction costs, the cost per discarded tube is estimated at $1.75 with $0.25 being soft dollars. However, an additional cost of recollecting samples occurs, adding another $1.15 in soft dollar costs and $2.45 in hard dollar costs for supplies used to collect the samples as well as the wasted reagents (raw good inputs) used when testing specimens for diseases and illnesses. Calculate the cost opportunity of performing at a Six Sigma level for hemolyzed specimens in the "Quality" tab of the spreadsheet.

Motion waste happens when lab professionals waste their time maneuvering around poor layouts and design, or a poor order of operations. In the "Service" tab, AM TAT Failed Goal is defined as the number of tests ordered and collected but not resulted prior

to the expected completion time. In some cases, this is attributed to delayed discharges in hospitals, which is a significant cost to hospitals. Assume that 1% of these delayed tests lead to delayed discharges and cost New York and D.C. $2,800, Illinois $1,342, and the remainder markets $1,120 in opportunity. One of your department senior leads is a black belt. She has done some preliminary work within these markets and found that the order in which phlebotomists visit floors is causing significant TAT delays from motion waste. She believes a better order of operations will result in a reduction of about 47% tests failing to meet the TAT goals. Calculate the opportunity costs.

Processing, or overprocessing, occurs when we input too much effort or too many resources into a process, which costs exceed the value being produced. In the lab, this occurs because of physicians ordering unnecessary, excessive tests for inpatient care. Because inpatient care is rarely reimbursed at a fee-for-service rate, unnecessary variable costs add up quickly and crush hospital profitability while adding no value in patient care. In fact, test utilization experts argue that in some cases this waste causes more harm than good to patients[7]. Assume a $1.50 cost in supplies, a $1.40 cost in soft dollars, and $0.75 cost in reagent supplies for the unnecessary testing. Your boss partnered with HAH's leading physician expert on test utilization. This expert estimates that approximately 4.2% of all inpatient testing in the system is wasted and unnecessary. Assume inpatient testing equates to 73% of all testing after reducing the outreach volume from the total performed volume.

Inventory waste in HAH occurs from poor planning and analytics. In the lab this is especially felt in blood bank when blood products expire and must be thrown away. With an average purchase price of $375 per blood product, and $11.75 for other expired products, lab leaders fight to ensure inventory is only ordered as needed. Your boss would like you to review and quantify the cost of expired products in the lab. One of the quality managers for the system shares that she feels with a better reporting system the lab could see a 50% reduction in blood product wastage. Assume the same for other expired products and calculate the opportunity for inventory waste.

Talent waste occurs in the lab most often when med techs (MT/MLT) are hired to perform the duties of lab assistants, a role designed for front-end specimen preparation and analyzer loading among other duties as assigned. Some of the challenges in ensuring appropriate talent is utilized at the top of its license are related to culture acceptance, state licensure requirements, and union contracts. These forces can be stumbling blocks for lab leadership and teams in accepting the expansion of lab assistant duties. NY and Illinois battle unions, but there are clauses in these contracts that allow for the negotiation of responsibilities. With the nation's shortage of MTs and MLTs, high utilization of contract

laborers, and the various strikes within New York, now is the time for renegotiation. Your boss asks you to review this opportunity by comparing the current state of lab assistants to med tech ratio against the top performing facilities. He would like to see ratios organized into peer groups by taking the total performing volume from months 13-24 and creating peer groups as follows: small (<200,000), medium (<500,000), large (<1,000,000) and x-large (≥ 1,000,000). FTE counts are found on the "Payroll" tab. Assume the average wage of an MT/MLT is $32.45 and a Lab Assistant is $19.42. Note that all phlebotomy talent has been removed from each facility for fair comparison.

Transportation challenges are not uncommon for the lab. In the outreach service line, couriers are an essential part of business as specimens need to be retrieved from practices and other hospital laboratories and brought to a reference laboratory for testing. At HAH, these services are outsourced to various companies. These costs are not included in the lab's budget, but rather fall under a courier department within the supply chain's control. Some of the physician offices are complaining of missing specimens sent to the lab. These statistics are found within the "Quality" tab. Couriers charge a flat fee for scheduled services averaging $35 per stop and picking up about 15 specimens per trip. About 3% of these lost specimens require a stat courier to be called and sent to the location for quick pick-up. Couriers charge a $100 flat fee plus $0.55 per mile driven. Assuming the average mile driven is 10.2 miles, calculate the cost of waste for these trips.

Questions

1. What is the biggest opportunity for the Illinois market?
2. How should these projects be presented for stakeholder buy-in based on each stakeholder's decision-making style?

Application Unit 1.4

Six Sigma is a powerful tool for assessing the cost of quality and understanding variation in processes using statistics. Your boss does not have a Lean Six Sigma background but sees the value in Lean Six Sigma despite the market's skepticism behind whether Lean principles are the only applicable philosophies for healthcare.

You decide to convert the current quality data into a Six Sigma quality dashboard. Using the "Quality" tab, answer the following questions.

Questions

1. Calculate the DPMO for Short Draws across each facility. Which facility is operating poorest? Best?
2. Your peers performed a study at facility 4T and found that for every hemolyzed specimen an average of 4.3 defects occurred when handling the sample. Assuming this defect rate per hemolyzed specimen holds true for 1C, which facility has the greatest risk for hemolyzed samples?
3. While assessing 4T's performance, your peers found the following:

	% Reworked/ Scrapped	% Volume Impacted
First Attempt	10%	100%
Second Attempt	5%	10%
Third Attempt	1%	5%

   Calculate the FTY and RTY of Facility 4X using the information provided from 4T about the DPU.

4. Dr. Salvanna made some comments to your boss that he found offensive. She accused your department of fixing numbers to make her region look bad (she references the DPMO numbers). She publicly shared that she doesn't trust anyone in your department because none of you have clinical backgrounds. She once wrote to your peer after completing an onsite visit the following, "How can you understand how the lab really works when you only spent a few hours of your time observing our operations, and the rest of your time with your face in a computer? Were you even working?" Put together a report comparing Dr. Salvanna's region against the other regions' performance in quality outcomes. Is Dr. Salvanna's region really the gold standard for the system? Why or why not? The audience for this report is your boss, Dr. Salvanna, and Dr. Fiore.

Application Unit 1.5

When capturing the voice of the customer, it is critical to realign that VOC to the VOB, culture values, and individual values. Any misalignment between these variables and complications are likely to follow. Using the data from the "VOC" tab, as well as the information from "Quality" and "Service," perform a review of the alignment between values and answer the following questions.

Questions

1. Create a SIPOC diagram of the HAH laboratory. You may need to do some general research outside of these case study facts to better understand the lab service line.
2. Design a CTQ tree using the variable headers of the "Quality," "VOC," and "Service" tabs in the data file. What, if anything, is missing for consideration?
    a. Consider using a 5 why brainstorming activity with your group as part of your CTQ tree critique.
3. How well aligned is the Maryland market with the VOC and VOB?
4. What is the biggest opportunity for HAH for improving alignment with the VOC from the survey responses?
    a. How will this be monitored and measured in operations to ensure alignment with the customer without jeopardizing the VOB expectations?

Application Unit 1.6

Your boss has partnered with Justin Grow and Dr. Fiore to pilot an approach for optimization while the system continues evaluating the sell or no sell of the lab. As part of this strategy, Mr. Grow is looking for improvements anywhere possible as he continues to make a name for himself. Your boss has targeted facility 3Y as a starting point. He wants you to help gather relevant data on the current state of service and productivity.

Use any relevant process mapping skills and the following information to map out a process and capture the current state of 3Y's core lab processes, capabilities, and opportunities. Note, assume core lab volume is the difference between Micro, AP, and Outreach on the "Service" tab.

Notes on the process map. The lab works diligently to partner with the physicians and patients. In general, a physician order is placed and sent down to the lab via electronic or paper orders. These orders are then received through automated steps, requiring the lab assistant to spend very little time per order placed. After orders have been gathered in batches of 35, then the lead starts to build out a plan for the team to gather specimens. Depending on the lead's directions, the team will then disperse out and gather up samples one patient at a time. After 5 collections are made, team members use the pneumatic tubes to transport specimens to the lab for processing. Once received in the lab, various steps are taken to receive, prep, and load instruments for testing. The instrument then tests samples based on orders placed and can process 120 samples on average in about 26.4 minutes. After a value is received, the system automatically updates the patient records for physician review. The sample is then stored for safe keeping should additional tests be required. Quality Control (QC) and Maintenance are independent activities required for machine functionality. They do not disrupt throughput.

Task Name	Frequency	Owner	Task Time (min)	Inputs	Outputs	FTE(s) Scheduled
Lab Order Placed	Per Unit	Physician	2	Lab Orders	Printed Labs	N/A
Lab Order Received and Reviewed	Per 30 min	Phleb	0.75		Pending Log	20.90
Collection's Organized	Per 60 min	Phleb	3.5			
Lab Collection Material Gathered	Per 60 min	Phleb	2	Supplies		
Patient Interaction	Per Patient	Phleb	1			
Labels Printed	Per Unit	Phleb	0.25		Labels	
Sample Collected	Per Unit	Phleb	2.3	Supplies	Sample	
Sample Labelled	Per Unit	Phleb	0.10	Label	Unit	
Sample Delivered to Lab	Per 5 Units	Phleb	15	Units	Discarded Specimen Bags	
Sample Processed and Received in Lab	Per Unit	Lab Assistant	1.1	Timestamp		19.08
Sample Loaded on Analyzer	Per 5 Units	Lab Assistant	2.5	Unit Rack		
Sample Test	120 per batch	Analyzer	26.4	Reagent	Unit	4
Result Read and Posted in EHR	Per Critical Value	MT/MLT	0	LIS Software	Resulted Value	65.86
Critical Value Called	Per Critical Value	MT/MLT	15	Call to Dr.		
Samples Removed and Stored	Per 15 Units	MT/MLT	2	Storing Rack, Fridge/Freezer	Stored Unit	
QC/Maintenance	Per 12 hrs	MT/MLT	120	Reagent	Accuracy/Precision	

Questions

1. Which map did you choose to illustrate the current state of things? Why?
2. Which step is the bottleneck in the process?
3. What is the time taken to produce 1 unit of work (resulted test) in the Core Lab?

Application Unit 1.7

As the system nears its final decision-making stage, Mr. Grow and your team have made some tremendous progress in designing a process improvement plan for Maryland's market. From various brainstorming sessions, you've been provided the following information:

Project Name	Savings ($000s)	Duration (Months)	Complexity	CoQ ($000's)
AP Consolidation	$1,000	14	High	$250
Micro Consolidation	$3,000	8	High	$100
Lab Assistant Ratio	$1,000	18	Moderate	$185
Standard Work	$150	1	Low	$0
5S	$90	2	Low	$7
Outreach Program	$11,000	36	High	$3,000
Blood Wastage	$1,500	12	Moderate	$0
AM TAT	$120	3	Low	$0

Mr. Grow shared with the group that the most important consideration is complexity in implementing projects. He doesn't want to exhaust the team with complex efforts in the beginning. He then expresses the need to save money quickly. Maryland consists of 5 hospitals. Your peers scored them as the following:

Name	Culture Assessment	Opportunity	Complexity
1Y	Myopic	$2,100	Low
2Y	Myopic	$13,140	High
3Y	Disjointed	$1,030	Moderate
4Y	Best of Friends	$895	Moderate
5Y	Hyperopic	$695	Moderate

You know from a project management perspective that some initiatives can be started at the same time while others will need to occur one after the other. It is believed that Lab Assistant Ratio, Standard Work, 5S Blood Wastage, and AM TAT can all happen independent of each other. However, AP and Micro Consolidation must occur before an Outreach Program can be established. It is believed that AP Consolidation should occur after Standard Work is implemented. Last, Micro Consolidation would benefit greatly from 5S and Leadership Standard work occurring prior.

Questions

1. Put together a project prioritization using the principles from 1.7 in scoring criteria.
    a. Assign a point value for each variable and score each project based on value and effort.
    b. Plot each project on a value vs effort grid.
    c. Should any projects be eliminated based on the feedback from Mr. Grow?
2. Perform a project plan based on the information provided and your recommendations to Mr. Grow.
    a. What is the correct order of projects given Mr. Grow's thoughts?
    b. Should there be a buffer given the cultural acceptance of change and what to expect? Why or why not? Provide your evidence and reasoning.

Reference Page

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Material Reference Table

Unit	Subunit	Title	Case Study	Action Items
0.0	0.0.1	Program Overview		
1.0	1.0.0	Lean Six Sigma Basics		
	1.0.1	Problem Solver's Dilemma		
	1.0.2	CVT Intro		
1.1	1.1.0	Cohesive Values Objectives	Case Study Overview Organization Overview: Mission and Values Culture Assessment Stakeholders	
	1.1.1	Cohesive Value Intro		
	1.1.2	Cohesive Value Application		
	1.1.3	Four Dimensions of Value		
	1.1.4	Business Value		Vision/Mission, Performance Goals
	1.1.5	Culture Value		
	1.1.6	Culture Value Application		Tools of Cooperation and Change
	1.1.7	Individual Value		
	1.1.8	The Big Five Personality Types		Assessing Individuals
	1.1.9	Leadership Decision Making Styles		
	1.1.10	Decision Making Application		Assessing Leadership
	1.1.11	Customer Value		
	1.1.12	Internal vs External Influential Customers		
	1.1.13	Problem Statement		Problem Statement
	1.1.14	Stakeholder Analysis Part 1		Stakeholder Analysis
	1.1.15	Stakeholder Analysis Part 2		
	1.1.16	Cohesive Value Conclusion		
1.2	1.2.0	Lean Six Sigma Introduction	Six Sigma Yield Comparisons Persuading Others in Lean Six Sigma	
	1.2.1	Lean Introduction		
	1.2.2	Lean History		
	1.2.3	Six Sigma History		
	1.2.4	Lean Six Sigma History		
	1.2.5	Six Sigma Level Yield		Gathering Data

	1.2.6	Six Sigma Level Yield Application		Calculating
	1.2.7	Lean Six Sigma In Practice		
	1.2.8	Applying Lean Six Sigma Knowledge		
	1.2.9	Summary		
1.3	1.3.0	Transformative Cohesion Objectives	Identifying Waste Quantifying Waste	
	1.3.1	Transformative Cohesion Intro		
	1.3.2	Lean Intro		
	1.3.3	Intro to Process Mapping		
	1.3.4	Anatomy of Process Value		
	1.3.5	Waste in Front Line Operations		
	1.3.6	Lean Waste - Waiting		
	1.3.7	Lean Waste - Overproduction		
	1.3.8	Lean Waste - Rejects Defects		
	1.3.9	Lean Waste - Motion		
	1.3.10	Lean Waste Overprocessing		
	1.3.11	Lean Waste Inventory		
	1.3.12	Lean Waste Transportation		
	1.3.13	Lean Waste Talent		
	1.3.14	Lean Waste Summary Table		
	1.3.15	Lean Tools For Front Lines		
	1.3.16	Waste Auditing		
	1.3.17	5S		
	1.3.18	Transformative Cohesion Summary		
1.4	1.4.0	Value Transformation Objectives	Pareto Analysis Variation and Standard Deviation Analysis	
	1.4.1	Value Transformation Intro		
	1.4.2	Intro to Lean Six Sigma		
	1.4.3	Understanding Variation		
	1.4.4	Interpreting Variation		
	1.4.5	Population vs Sample Data		
	1.4.6	Standard Deviation with Population Data		

	1.4.7	Standard Deviation with Population Data Excel	Process Performance: DPU DPMO FTY RTY	
	1.4.8	Standard Deviation with Sample Data		
	1.4.9	Standard Deviation with Sample Data Excel		
	1.4.10	Pareto Analysis		
	1.4.11	Pareto Analysis in Excel		
	1.4.12	Intro to Six Sigma Metrics		
	1.4.13	Six Sigma Metric Application		
	1.4.14	Calculating DPU		
	1.4.15	Calculating DPMO		
	1.4.16	Calculating First Time Yield		
	1.4.17	Calculating Rolled Throughput Yield		
	1.4.18	Communicating Lean Six Sigma		
	1.4.19	Value Transformation Conclusion		
1.5	1.5.0	Approaching the Problem Objectives	VOC Alignment SIPOC CTQ Tree 5 Why Brainstorming	
	1.5.1	Intro to VOC		
	1.5.10	Approaching the Problem		
	1.5.11	Approaching the Problem Conclusion		
	1.5.2	Obtaining the VOC		
	1.5.3	VOC Application		
	1.5.4	SIPOC Diagram		
	1.5.5	SIPOC Diagram Application		
	1.5.6	CTQ Tree		
	1.5.7	Intro to Approaching the Problem		
	1.5.8	The Transformation Methodology		
	1.5.9	5 Why Brainstorming		
1.6	1.6.0	Process Mapping Objectives	Detailed Process Map Cross-Functional Process Map	
	1.6.1	Intro to Process Mapping		
	1.6.10	Value Stream Map Application		
	1.6.11	Value Stream Map - Cycle Time		
	1.6.12	Value Stream Map - Lead, Process, and Efficiency Calculations		

	1.6.13	Value Stream Map - Bottleneck and Capacity	Value Stream Mapping: Cycle Time Lead Time Process Time Efficiency	
	1.6.14	Process Mapping Conclusion		
	1.6.2	Process Elements		
	1.6.3	Process Components		
	1.6.4	Process Maps for Frontlines		
	1.6.5	Detailed Process Maps		
	1.6.6	Cross-Functional Maps		
	1.6.7	Intro to Value Stream Maps		
	1.6.8	Value Stream Map Anatomy		
	1.6.9	Value Stream Map Calculations		
1.7	1.7.0	Quality and Project Management Overview	Project Organization: Project Scoring Project Selection Project Timeline CoPQ and CoQ Value vs Effort Grid Project Scoring	
	1.7.1	Intro To Quality Management		
	1.7.10	Project Viability Modeling		
	1.7.11	Building a Six Sigma Team		
	1.7.12	Project Timeline		
	1.7.13	Lean Six Sigma Roadmap		
	1.7.14	Quality and Project Management Summary		
	1.7.2	CoPQ vs CoQ		
	1.7.3	CoPQ vs CoQ Application		
	1.7.4	Project Management Intro		
	1.7.5	Project Selection		
	1.7.6	Project Selection Process		
	1.7.7	Value vs Effort Grid		
	1.7.8	Project Scoring - Weighting		
	1.7.9	Project Scoring - Weighting Application		