

Author: Ahles, Joshua R.

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STUDENT:

NAME: Josh Ahles

DATE: 12/12/2019

ADVISOR: (Committee Chair if MS Plan A or EdS Thesis or Field Project/Problem):

NAME: Sally Dresdow, DBA

DATE: 12/12/2019

This section for MS Plan A Thesis or EdS Thesis/Field Project papers only

Committee members (other than your advisor who is listed in the section above)

- | | |
|------------------------|-------|
| 1. CMTE MEMBER'S NAME: | DATE: |
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Ahles, Joshua R. *Adapting to the Shift in Generations within Manufacturing*

Abstract

This research paper provides an analysis and recommendation to counteract Company XYZ's current challenge of experienced employees retiring and being backfilled by younger employees who may lack the mechanical abilities to perform at the same level as the experienced retired employees.

Individuals from Company XYZ volunteered their time to participate in the research project by providing their feedback to a survey. The survey consisted of questions about how Company XYZ has implemented different projects and processes to counteract the challenge of younger generations entering the manufacturing setting. There were also questions requesting feedback on how Company XYZ can counteract the challenge in the future. The data was compiled and analyzed for the purpose of putting together several recommendations on techniques, processes, and methods to be implemented at Company XYZ to remove the risk of losing productivity and efficiency based on the new younger employees lacking the overall mechanical abilities that the experienced employees had.

Table of Contents

Abstract	2
List of Tables	5
Chapter I: Introduction.....	6
Statement of the Problem.....	8
Purpose of the Study	8
Assumptions of the Study	9
Definition of Terms.....	9
Limitations of the Study.....	10
Methodology	10
Chapter II: Literature Review	11
Continuous Improvement Long Term Success.....	11
Organizational Culture and Environment	13
Motives and Expectations.....	14
Training.....	16
Management’s Role	17
Implementation Approach	19
Project Management	20
Employee Involvement Levels	21
Feedback and Results.....	22
Conclusion	23
Chapter III: Methodology	24
Subject Selection and Description	24

Instrumentation	25
Data Collection Procedures.....	25
Data Analysis	25
Limitations	25
Summary	25
Chapter IV: Results.....	27
Demographics	28
Item Analysis	28
Conclusion	35
Chapter V: Discussion, Conclusion and Recommendation	37
Discussion	37
Conclusions.....	39
Recommendations.....	39
References.....	42
Appendix: Survey Questions	46

List of Tables

Table 1: Demographics28

Table 2: Average Responses for Each Question by Job Classification29

Table 3: Average Responses for Each Question by Years of Experience29

Table 4: Question 1: Proactive Processes Implemented by Company XYZ30

Table 5: Question 2: Newer Employees Do Not Have the Mechanical Ability as Older
Employees.....31

Table 6: Question 3: There is a Significant Risk if Changes are not Implemented at Company
XYZ32

Table 7: Question 4: Tools and Automation have been Implemented to Counteract Shift in Labor
.....33

Table 8: Question 5: Training Methods and Processes are Important to Develop the Mechanical
Ability34

Table 9: Question 6: Standard Operating Procedures Are Being Used to Document Tribal
Knowledge35

Chapter I: Introduction

Company XYZ is a family owned heating, ventilation, and air conditioning (HVAC) manufacturer that was started by two brothers in the 1940s. Originally, Company XYZ began serving central Wisconsin and has grown to be a leader in the HVAC industry throughout the world. Company XYZ has eight different manufacturing facilities throughout the United States with a facility in India and Mexico. At its inception, Company XYZ had only 20 employees and in 2019 the company employed over 2,000 people.

Company XYZ has been named the state's manufacturer of the year more than once. Its success was attributed to various key factors, however the key to enhanced products and processes within each facility was directly related to the skill and innovation provided by the employees. The employees who added their mechanical knowledge to grow Company XYZ were reaching the age of retirement. The average tenure of employees at Company XYZ who were reaching retirement age exceeded 25 years.

The long careers of existing and past employees were a result of the employees working together to create and maintain a warm welcoming culture at Company XYZ. The culture consisted of a positive engaging culture that relied on the employees' knowledge and involvement. A business decision that was directly related to the mechanical enhancement of the current and past employees included investing in advanced equipment that could result in increased complexity to operate. However, based on the level of employee skill there was no concern for that employee would not be able to operate the equipment correctly. In the past five years, Company XYZ had an average retirement rate of 20 employees per year. The retired employees were being backfilled with employees who lacked the mechanical experience and the

mechanical ability to perform at the same level as the employees who were retiring with 25 plus years of experience.

The new employees lacked the experience and the mechanical ability which had resulted in lower quality products, lower productivity, and a higher turnover rate. The new employees did not offer the level of aptitude to use the essential tools in the manufacturing setting. When the new employees attempted to use tools that they were not familiar with, it created possible safety hazards. The new employees who have backfilled the experienced retired employees were not familiar with the culture of Company XYZ which caused a culture shock for the employees. New employees who do not fit into the strong culture at Company XYZ could cause turmoil and challenge the high performing culture at Company XYZ. If proactive changes were not made to address the large issue of experienced employees retiring and being backfilled with less skilled employees, the culture, competitiveness, and quality of Company XYZ could decline which would lead to losing customers and overall business.

Company XYZ had invested into continuous improvement by creating a department to lead continuous improvement initiatives. The focus in the continuous improvement department had evolved into ways the company could retain the tribal knowledge that was lost through retirement. Along with retaining the knowledge of retiring employees, continuous improvement initiatives had evolved into utilizing different tools focusing around technology to connect to the advanced technological abilities of younger generations. Continuous improvement and automation was critical to the continued success at Company XYZ while eliminating the challenges of employees being less mechanically inclined.

Statement of the Problem

Company XYZ had experienced a large number of retirements. The new employees who were hired were less skilled and could not perform at the required levels. The lack of mechanical ability in the new employees had the potential to cause lower production, efficiency, and quality. Without evolving the continuous improvement philosophy or adding further countermeasures, a potential result could include loss of sales, loss of market share, and loss of jobs for employees at Company XYZ.

Purpose of the Study

The purpose of this study was to investigate and learn about potential initiatives and processes that could be implemented to counteract the challenges of the change in mechanical enhanced capabilities between the employees who are retiring from Company XYZ with 25 plus years of experience and the young employees who are the backfills will add value to understanding the skill gap.

To obtain the research the following techniques were:

1. Data and information was gathered from surveys completed by employees with different ranges of experience to understand if there are trends within each range of years' experience.
2. Data extracted from the Bureau of Labor Statistics over the past 25 years was analyzed to understand the trends of employment within manufacturing throughout the generation change.

Learning and understanding potential opportunities provided by employees at Company XYZ to counteract the shift of mechanical knowledge lacking in new employees provided an idea of the current state along with the future state of Company XYZ. Understanding the current

state will help improve the mechanical knowledge lacking in new employees resulting improving performance.

Assumptions of the Study

The assumptions of this study were that:

1. Company XYZ will allocate the needed resources to manage and maintain any proposed programs.
2. Company XYZ will not lose significant sales over the next five years which would jeopardize the justification and need for countermeasures in the labor shift.
3. The employees who have committed to retiring in the next five years will retire
4. The feedback received via interviews and surveys will be true data provided by employees at Company XYZ.

Definition of Terms

The following terms were used in this research paper and were specific to Company XYZ. Each term is defined below:

Continuous improvement. The philosophy of not being reluctant to enhancing a product or process.

Organization culture. The underlying beliefs, values, and environment within a company that can drive behaviors of the employees.

Pitstop. An event or project at Company XYZ that consists of multiple resources being involved to identify, analyze, and implement a solution to a problem

Tribal knowledge. Unwritten information that has been learned throughout excessive years of experience.

Limitations of the Study

The results of this study are limited to Company XYZ.

Methodology

The data used in the research paper was received via surveys from employees at Company XYZ. The survey consisted of six questions in which each question had a rating of 0 to 5 with 5 being the most agree to the questions. The data was analyzed by grouping the individuals who participated from Company XYZ into groups based on their job classification and years' experience. The survey was chosen due to the ability to receive feedback from a wide range of employment classifications and years' experience. The goal of the survey was to understand the past, current, and future state of process improvements implemented by Company XYZ.

Chapter II: Literature Review

At Company XYZ, the change in the employees' mechanical skills potentially presented a threat of losing sales, reduced efficiency, lower quality, and overall change in the culture. The important areas of continuous improvement within an organization were discussed in this review by providing examples and recommendations from past projects. Ultimately, each critical area required proactive approaches to complete a successful continuous improvement initiative (Bass, 2019). Key aspects such as continuous improvement for long term business success, organizational culture, and project expectations are discussed in deep detail by implementing the continuous improvement not for the short term and having realistic expectations of the projects.

Employee involvement is essential within continuous improvement projects by including employees from different areas of the business to be involved in projects while continually requesting feedback and reviewing the results of projects. In successful continuous improvement projects, the management team works with the employees to develop an enhanced and valuable training plan so that the implementation of the project is not a failure. Project management skills were utilized within successful continuous improvement initiatives by understanding what approach and technique best fits the organization (Bass, 2019).

Continuous Improvement Long Term Success

Many companies believe that implementing continuous improvement into their operations and will resolve any issue they have. Continuous improvement is a tool where a company constantly looks into ways that they can develop their processes and products thus remaining ahead of their competition or threats (Terry, 2019). Continuous improvement initiatives are not always a success in a manufacturing setting and they need to have the proper time and resources allocated to the initiative (Antony & McLean, 2013). There are several

important areas to have added additional attention and efforts towards to avoid a failed initiative. Areas that are critical to the success of improving the organization consists of: the current state of the organization's culture, planning and involvement process in the given area, the implementation aspect including training, and the sustainability aspect to continue to drive the changed behaviors (Kuppler, 2013). Antony and McLean (2013) performed a meta-analysis on the failures in proactive approaches within manufacturing between years 1995-2012. Antony and McLean (2013) reviewed 377 papers, excluded duplicate information and evaluated the significance of the article which resulted in using information from 43 articles. Antony and McLean (2013) that there were eight themes relevant to failed continuous improvement initiatives. They were: motives and expectations, organization culture and environment, the management leadership, implementation approach, training, project management, employee involvement levels, and feedback and results" (Antony & McLean, 2013).

Not all organizations have the resources to allocate the needed tools and time towards a continuous improvement initiative, however Terry (2019) states that events can range from a rapid or short-term event to building the philosophy into the employees' day-to-day work (Terry, 2019). The change in mechanical skillset within a workforce is a potential threat to the organization and should lead to the need of continuous improvement which could include sacrificing certain areas of the business (Terry, 2019). Overall output of production will be at lower performance level during continuous improvement initiatives (Keller, 2009). The goal of continuous improvement is to implement change for the long-term success (Keller, 2009). Quality is an aspect that should never be sacrificed during continuous improvement projects and initiatives (Terry, 2019).

Continuous improvement should not be looked at as way to save money for an organization but as Keller (2009) overviews, the key purpose of continuous improvement strategies is to improve the skills and capabilities of each and every employee within the organization resulting in the employees effectively engaging and participating in problem solving in their respective work areas (Keller, 2009). Continuous improvement in an organization is about investing back into the employees to enhance their skills long term. In 2008 Toyota had low sales but rather than laying off their employees the company decided to halt production for two weeks and hold training and development sessions for their employees (Lancaster, n.d). This shows the commitment that the company has devoted towards continuous improvement of their employee workforce (Lancaster, n.d).

Organizational Culture and Environment

Organizational culture can be best defined as values and actions that make up the specific social and psychological setting within an organization (Torben, 2015). The organization's culture is what makes up the beliefs and values of each employee along with the overall organization's beliefs and values which drive the way that the employee behaves. The culture is critical to the success of the business and the employee's satisfaction so much that on average an employee under 30 years old is willing to give up approximately \$6,700 annually in salary to part of a strong and positive culture (Alton, 2017).

The culture of the organization has the opportunity to cause a potential failure of a continuous improvement initiative based on employee resistance and lack of desire to see the initiative succeed (Antony & McLean, 2013). Potential issues resulting in failure to implement continuous improvement consist of losing market share to competitors, inefficient productivity, lack of quality (Antony & McLean, 2013). Resistance to change in an organization is a barrier to

success and can be connected to the structure of the organization and overall support received from different areas within the organization (Antony & McLean, 2013).

Culture is a process of learning for a new employee in which it will help that employee better fit into the environment of the organization (Rubrich, n.d.). A less effective culture does have opportunity to gain strength through lean concepts and principles. Common misunderstandings regarding continuous improvement such as all continuous improvement initiatives are to be implemented the same without making modification to the initiative specific to the motive can result in a failed initiative (Kuppler, 2013).

A culture that is not a high-performance culture and does not prioritize continuous improvement principles will be content with the current state and does not have a desire to improve (Markovitz, 2019). Once the organization participates in lean initiatives that are successful the culture shifts to desiring the need to implement projects and career improvements based off the past success (Markovitz, 2019). Young generations look at top management employees as role models which makes it important for the culture to embrace the desire to develop the young employees throughout their career (Steel, 2016). The generations that are leaving the workplace to retirement are less worried about the title that their role is considered, however the young generations pay much more attention to their titles and look at their title as their worth (Steel, 2019).

Motives and Expectations

The reasoning and overall motive of the potential continuous improvement initiative is critical for the success of the initiative. A motive that could cause a failed lean project would be to implement an initiative because other areas have done so in the past (Antony & McLean, 2013). The motive should be directly related to the specific area in which the initiative is being

proposed to be implemented within. A valued motive could include a need for change because of an area's performance that has plateaued and there is a clear need to improve. A way to get an overall understanding of each team member's motive within the organization is to have each member write down a mission statement including the intention and motive for the initiative then review together (Thora, 2017).

Before a project can be put into action, it is critical to define the intended outcome of the project. Defining the goals collaboratively with the entire workforce engages the team and creates a connected involved culture that ensures positive workplace motivation (Corriero, n.d.). Not defining the expectations of the project can result in a project that is unorganized and less effective. The goals and expectations of the organization need to be defined as achievable and they need to be set in accordance to each team member's overall strength and ability (Thora, 2017). If expectations are not defined the result can be a low achieving employee and ultimately it creates a divide between the employee and the rest of the team (Thora, 2017). Discussing and agreeing upon the goals, values, and overall processes within the continuous improvement initiative within an organization leaves no room for confusion throughout the project or initiative (Heathfield, 2019).

The main key to a successful continuous improvement initiative and creating a continuous improvement culture is participation from the entire workforce (Corriero, n.d.). Only having top management participate in events will decrease the overall motivation of the workforce and the trust that the employees have in the organization (Rivera, 2013). Tasks that are assigned to members with less ability can result in a failed initiative due to a member being overwhelmed and under-resourced. Inaccurate and higher expectations can lead to disappointment and sense of failure for the team even though the team was able to accomplish

tasks (Antony & McLean, 2013). Younger generations are more likely to blend their roles and responsibilities compared to the generations that are retiring who would rather have their defined role and stay within the parameters, the need to have structure and defined tasks for young generations is key otherwise their focus will not be towards what their role was defined as (Heathfield, 2019).

Training

Continuous improvement initiatives require different techniques and methods of training specific to the initiative, however it is almost certain that training will be required for every initiative if the intent is for long term success and engaging in employee buy-in (Kluczny, 2019). Successful training initiatives are developed to address the level of the trainees and as well as the needs of the organization because there is not a training process that works for every initiative (Kluczny, 2018). At the start of the training initiative it is important to communicate how the change will directly benefit the employee (Dalto, 2015). It is critical that the expectations and value of the training is communicated to the employees so that they are aware of how the training will improve their career and daily tasks (Shaw, 2019).

A common reason of failed initiatives can be connected to the training material and overall process being at a level above the trainee's ability, it is key to understand the current ability of the trainees (Antony & McLean, 2013). Past failed initiatives relied on the trainees retaining and remembering a large amount of information. To mitigate the risk of the trainees forgetting the information, it is critical to create the proper training aids and material that the trainee can utilize daily on their job as a reference (Dalto, 2015).

As experienced employees start to retire with a large amount of years' experience, it becomes critical for the company to capture the tribal knowledge prior to the employee retiring

so that the new employees can be trained properly. To counteract the change in the younger generation's lack of manufacturing experience could include implementing standard work procedures and instructions which can be utilized on the employee's daily job (Bloom, 2019). The format of the standard work instructions should include audio or video recordings of the experienced employees providing step by step instructions (Potoczak, 2016). Along with standard instructions it is important to be able to have an open channel of communication and feedback which will lead to collaborative thinking (Bloom, 2019).

The setting in which training is occurring can also be critical to the value of training for the individuals involved. Employees are more likely to utilize the training techniques and tools that they learned in the training sessions if the training was performed in the same or similar environment in which their daily job will require it (Dalto, 2015). Past failed initiatives performed training in environments that are not comparable to the environment in which the employee will be applying the principles on a regular basis. The type of training has evolved with the young generations entering the workforce. Training in groups or teams have been proved to be more accepted by the younger generations based on the school systems over the past 20 years have evolved their structure to utilize groups and team activities much more (Heathfield, 2019).

Management's Role

Behavioral expectations in an organization are directly related to the management's commitment and support to the initiatives of the organization (Rubrich, n.d.). Failed initiatives consist of the team feeling a sense of isolation from the organization without needed tools or support to implement a successful initiative. A successful continuous improvement initiative consists of the management team allocating a high priority to the initiative and not let daily

production intervene with the need to have employees involved in the continuous improvement initiative (Antony & McLean, 2013). Failed initiatives could have been started with the understanding of need to change and implement, but due to other priorities arising within the business the initiative loses priority and falls off the radar. When a management team does not physically display their commitment to the initiatives by not attending continuous improvement presentations or lacks the participation in the events, it reduces the importance of what is trying to be implemented (Markovitz, 2019).

The management team needs to understand that a lean initiative takes time and immediate results may not be the case, however the initiative will provide a larger impact in the future. By addressing a need for change in an organization is the first step, however if the management team wants action to be taken, they need to do more than just talk about the problem and actually make time to fix the issue (Markovitz, 2019). Failed initiatives were caused by the management team deciding that the team did not have enough resources to backfill employees on their day to day tasks which resulted in employees who were assigned to the initiative to have to abandon the project and go back to their day to day task. Management's decision to not allow a lean initiative to occur based off the idea that the current need to accomplish the daily tasks and not committing to improve the organization for the future hurts the overall success of organization (Keller, 2009). Every level of the management team must provide a leadership mentality by supporting and promoting continuous improvement initiatives within the organization and in the employee's personal career (Antony & McLean, 2013).

Younger generations entering the manufacturing field want to continue to grow their career and their progress with the organization (Steele, n.d). The young generations may come off aggressive in their career mindset, but their desire to continue to pursue advanced degrees

and training shows that they are committed to continuing to improve their ability and it is important for the management team to offer the opportunities for the young employee to utilize and conquer (Steele, n.d). Regardless of the impact of the continuous improvement initiative (self or organization improvement), the management team needs to appreciate and value the initiatives of continuous improvement which will lead to a culture that has the desire to innovate, collaborate, and progress (Steele, n.d). A successful management team that supports and commits their efforts to improving the organization is effective at communicating the changes and reasoning behind the changes to the rest of the organization (Stevens, n.d.).

Younger generations value communication that is at a personal and one on one level because they look at those interactions as a business personal relationship and builds trust between the manager and employee (Steele, n.d). It is very important for management to provide the proper feedback to the young employees, both positive and negative feedback should be communicated and coached to the employees for their own personal growth (Rivera, 2013). The trust that is built between the management team and the young employees can be described as easy as a good manager walks the talk (Corriero, n.d.). Young employees look at their management team as leaders who are willing to get their hands dirty and actively participate in the events and activities that the leaders have stated are so important for the organization (Rivera, 2013).

Implementation Approach

Ineffective implementation and execution of a continuous improvement initiative can create a sense of frustration within the organization and lead to a failed initiative (Antony & McLean, 2013). Failed initiatives in the past did not allocate enough time to the implementation phase based on the team's desire for immediate results and function ability. Projects and

initiatives tend to evolve as the project is being implemented, it is important be able to adapt to any changes or risks that could be associated with the project (Halabuda, n.d.). The time period associated with the implementation of the initiative needs to be accurately forecasted and supported. Lacking an organized roadmap or timeline can lead to the initiative losing focus and ultimately a failed initiative (Antony & McLean, 2013).

Successful initiatives implement the initiative at a time that makes the most sense for the business. Failed initiatives were resulted by the initiative being implemented at time when the required resources could not be utilized (Halabuda, n.d.). Identifying the resources to be utilized and their availability will avoid issues during the implementation stage of the initiative of not being able to rely on the resources that were originally assigned (Halabuda, n.d.). The organization needs a picture of what is to be implemented and how each area is being affected during the implementation (Antony & McLean, 2013). Tools associated with the implementation stage is critical to communicate and standardize the process for the future workers. Documenting and receiving feedback during the implementation of the project is critical to be able to evolve the project and not lose the overall scope (Yoskovitz, 2012).

Project Management

Prior to an initiative being implemented or developed it is critical that the project is selected with the understanding of the organization's capabilities. Often times failed initiatives are due to the project not containing a properly defined scope (Antony & McLean, 2013). A successful project contains an accurate defined scope with detailed objectives and deadlines. The project needs to be managed with enough resources so that if changes do occur to the scope, they are effectively communicated to the individuals involved. Along with allocating the desired resources it is also important to understand project dependencies and the relationship between

the dependency and the task (Halabuda, n.d.). The dependencies of each task will drive the structure of the timeline generated for each project and continuous improvement initiative (Antony & McLean, 2013). Failed initiatives did not contain scheduled meetings and review sessions of the status of the project.

Lack of communication within the initiative will lead to team members working in an isolated manner which has the opportunity to lose the overall expectations and goals of the initiative. Successful communication in project management situations include not only having the presence physically displayed but more importantly to listen and understand the issues and possible solutions proposed by the team members (Halabuda, n.d.). Problems and changes will occur to the original plan, it is important discuss the problems and translating them into different tools such as a fish bone diagram, linear/bar graph, and other project management tools are useful to adapt the project to the goals that the project was originally created to meet (Boyer, n.d.). Effective project managers facilitate the status updates throughout the project; however, they do not micromanage their team (Schiff, 2014). Young generations enjoy the freedom to lead their own aspects of the projects but still being able to approach their manager with questions and concerns (Craig, 2019). Having an open-door policy will create a sense of trust between the young employee and their manager (Schiff, 2014).

Employee Involvement Levels

An approach consisting of the management team making the decisions for the continuous improvement initiative and demanding employees follow the changes creates an opportunity for failure within the organization. Creating a fun and enjoyable environment for employees to get involved in projects will translate into a more engaged and comfortable workforce (Seselj, 2017). Employees are more likely to be passionate and motivated towards an initiative if they were part

of the project. Failed initiatives lacked employee engagement and involvement which lead to the employees not feeling a sense of empowerment and motive to improve the organization (Antony & McLean, 2013). The size of the organization and labor capacity constraints can limit the number of employees who are able to be involved in the initiative.

Companies tend to look for volunteers to participate in continuous improvement initiatives which can be an issue at times. Younger generations tend to appreciate the recognition of involvement in initiatives rather than receiving some sort of reward (Seselj, 2017). It is important to reward the employees who were involved in the initiative but the rest of the workforce who will be affected by the continuous improvement initiative within their day to day role need to also be motivated and rewarded once the initiative is fully engaged by rewarding when milestones are achieved (Schiff, 2014).

Feedback and Results

It is very common that a continuous improvement initiative requires adapting and conforming once the initiative is implemented. The way to understand the level of success of the initiative is by collecting feedback and communicating the results. Feedback is considered engaged and effective listening which is critical to build in an employee/manager relationship (DeFranzo, 2015). Understanding if the initiative is meeting the expectations it is important to determine metrics that can be used to compare the results (Antony & McLean, 2013).

Financial impact such as the savings associated with the initiative is greatly valued when reviewing the impact of the initiative. Common failed initiatives did not contain desirable results which made it impossible to evaluate if the initiative was successful. A common reaction for an employee within the organization can be to state the issues involved with a given process or project, but member who provide the most impact on the team address the issues but also provide

a potential resolution (Antony & McLean, 2013). The team involved needs to be able to report failures with resolutions to counter the issues (Antony & McLean, 2013). It is important to hold review sessions after the implementation to learn what could have been done differently to make the implementation more successful. Understanding the gaps and opportunities of the initiative will create a lean culture that builds on continuing to improve the organization. Creating a culture and workplace environment that looks at feedback of a continuous improvement initiative as a way to grow rather than negatively assessing the project will create an open and inviting team that is comfortable with providing their input (O'Berry, 2010).

Conclusion

This review consisted of understanding studies that have displayed a further connection to why certain continuous improvement initiatives failed in a manufacturing setting. Understanding the failures and the differences in younger generations will be able to provide enhanced tools and techniques to be utilized during a generation change in the workforce change in a manufacturing setting. Focusing on the eight themes within the manufacturing environment, this review provides further understanding of tactics and tendencies to be utilized in continuous improvement initiatives.

Chapter III: Methodology

Company XYZ was experiencing retirement rates higher than they have ever experienced. The employees that were retiring were leaving with an average of over 25 years' experience and knowledge. The employees who were backfilling the retired employees did not have the same mechanical aptitude and ability which caused lower production, lower efficiency and quality, and threatened to change the organization culture. Understanding the importance and severity of the change in mechanical ability in the younger generation will meet the purpose of this research which was to understand techniques to counter and conquer the challenges. Before proposing solutions, it was important to understand the current state of techniques and processes in place at Company XYZ. The study included understanding different processes and initiatives that Company XYZ had implemented in different departments in the company. An organization is much more likely to implement new proactive approaches if their workforce is involved from the start of the process which will be very important in this study.

Subject Selection and Description

The subjects for this study included volunteers who were currently employed at Company XYZ. A representative sample from each classification or category of employees were asked to participate. For example, requests to volunteer to participate in the survey was to: four first shift shop employees from Department A, four first shift shop employees from Department B, four first shift shop employees from Department C, four first shift shop employees from Department D, and four first shift shop employees from Department E. The breakdown of the requests that were sent to employees within each department were 20 employees from each of the following areas: first shift shop employees, second shift shop employees, third shift shop employees, manufacturing engineers, production supervisors, and manufacturing managers.

Instrumentation

A survey was created which was designed to obtain information to understand the current state of culture and practices at Company XYZ. No personal identifying information was requested. The survey (Appendix) consisted of several questions with a Likert scale of 1 to 5 with 1 being least agree and 5 being agree the most. The survey also consisted of multiple questions that were open-ended. The intention of the open-ended questions was to spark conversations and to learn common factors between the employees.

Data Collection Procedures

To protect the individual's identity the survey was sent via electronic and paper form to the volunteers. The electronic version was sent to employees who had a Company XYZ e-mail address. The paper forms were given to employees who did not have a Company XYZ e-mail address.

Data Analysis

The data from the questions that contained a rating of 1 to 5 were compiled by grouping the ratings with the job classification. The open-ended questions were reviewed and documented to understand common feedback.

Limitations

The only participants of the survey will be Company XYZ employees. The cooperation of the participants was voluntary and no one was required to complete the survey.

Summary

The survey was designed to understand the current state of the risk of the lack of mechanical ability in the younger generation workforce at Company XYZ. The group that was

asked to participate contained employees with a wide range of years of employment at Company XYZ and also contained a variety of different areas of employment within Company XYZ.

Chapter IV: Results

Company XYZ has had an increase in retired employees being backfilled by employees over the past several years who are younger in age and may lack the mechanical ability that the experienced employees had. The survey was intended to capture the past, present, and future plans to counteract the challenge of the less experienced employees entering the workforce at Company XYZ. A total of 120 surveys were sent to employees at Company XYZ. Of the 120 surveys, 95 were returned. Twenty surveys were sent to each of the following six job classifications within Company XYZ and each classification returned following number of surveys: 15 were returned from production personnel 1st Shift, 18 were returned from production personnel 2nd shift, 15 were returned from production personnel 3rd shift, 16 were returned from supervisor personnel, 15 were returned from engineering personnel, and 16 were returned from management personnel.

Engineers returned the highest average score meaning they agree most with the survey questions. Managers returned the 2nd highest results, followed by supervisor returning the 3rd highest results. 1st shift production employees totaled the 4th highest, 2nd shift production employees totaled the 5th highest, and 3rd shift production employees totaled the lowest total average results meaning they least agree to the survey questions. Engineers, managers, and supervisors resulted in an average score that was higher or agreed more than the total average score of all of the surveys returned. Employees who had been with the company for 0 to 5 years averaged the highest results stating they agreed most with the survey questions, employees with 6 to 10 years' experience averaged the 2nd highest total, employees with over 15 years' experience averaged the 3rd highest total, and employees with 11 to 15 years' experience averaged the lowest total score stating that they agree least with the survey questions. Employees

with 11 to 15 years' experience resulted in an average score that is less than the total average score of all results, the other three age ranges were all higher than the total average.

Demographics

The Table 1 displays the demographics of the research. The demographics consisted of employees at Company XYZ from the job classifications and years' experience.

Table 1

Demographics

Job Classification	Years' Experience
Production (1st Shift)	0 to 5
Production (2nd Shift)	6 to 10
Production (3rd Shift)	11 to 15
Supervisor	Over 15
Engineer	
Manager	

Item Analysis

Table 2 displays the average results from each survey question in the survey separated by the job classification. The total average is an average of the six questions. Engineers resulted in the highest total average score and production employees from 3rd shift resulted in the lowest total average score.

Table 2

Average Responses for Each Question by Job Classification

Job Classification	n	Q #1	Q #2	Q #3	Q #4	Q #5	Q #6	Total Avg
Production (1st Shift)	15	3.33	3.80	3.60	3.13	3.53	2.93	3.39
Production (2nd Shift)	18	2.89	3.67	4.00	2.67	4.67	2.50	3.40
Production (3rd Shift)	15	3.20	3.40	3.53	3.13	3.73	2.73	3.29
Supervisor	16	3.25	3.69	4.19	3.25	3.81	2.94	3.52
Engineer	15	3.40	3.60	4.27	3.53	4.53	3.20	3.76
Manager	16	3.25	3.69	4.31	3.44	4.06	3.19	3.66
Total	95	3.21	3.64	3.99	3.18	4.07	2.91	3.50

Table 3 displays the average results from the survey broken down by the years' experience of the employees. The total average is an average of the six questions. Employees with 0 to 5 years' experience resulted in the highest total average score and employees with 11 to 15 years' experience resulted in the lowest total average score.

Table 3

Average Responses for Each Question by Years of Experience

Years' Experience	n	Q #1.	Q #2	Q #3	Q #4	Q #5	Q #6	Total Avg
0 to 5	21	3.43	3.62	3.95	3.33	4.00	3.19	3.59
6 to 10	23	3.09	3.57	4.30	3.26	4.26	2.87	3.56
11 to 15	25	3.24	3.56	3.72	2.96	3.80	2.76	3.34
Over 15	26	3.12	3.81	4.00	3.19	4.23	2.85	3.53
Total	95	3.21	3.64	3.99	3.18	4.07	2.91	3.50

Table 4 displays the survey results from question 1, "Company XYZ has implemented proactive processes and enhancements throughout the ongoing shifts in generations within the labor force". The rating scale was 0, least agree, to 5, most agree. The average is the mean of the results grouped by the specific job classification or years' experience range. Engineers

resulted in the highest average score for question 1 and 3rd shift production employees resulted in the lowest average score. Employees with 0 to 5 years' experience resulted in the highest average score and employees with 6 to 10 years' experience resulted in the lowest average score. The rating selected the most for question 1 was 3.

Table 4

Question 1: Proactive Processes Implemented by Company XYZ

Job Classification	n	0	1	2	3	4	5	Avg
Production (1st Shift)	15	0	0	1	8	6	0	3.33
Production (2nd Shift)	18	0	0	6	8	4	0	2.89
Production (3rd Shift)	15	0	0	2	8	5	0	3.20
Supervisor	16	0	0	2	8	6	0	3.25
Engineer	15	0	1	1	4	9	0	3.40
Manager	16	0	0	3	6	7	0	3.25
Total	95	0	1	15	42	37	0	3.21

Years' Experience	n	0	1	2	3	4	5	Avg
0 to 5	21	0	0	0	12	9	0	3.43
6 to 10	23	0	0	7	7	9	0	3.09
11 to 15	25	0	0	4	11	10	0	3.24
Over 15	26	0	1	4	12	9	0	3.12
Total	95	0	1	15	42	37	0	3.21

Table 5 displays the survey results from question 2, "Company XYZ is challenged with newer employees that do not have the mechanical ability to perform at the same level as the older employees". The rating scale was 0, least agree, to 5, most agree. The table shows results by job classification and then by the years of experience. The average is the mean of the results grouped by the specific job classification or years' experience range. Production employees from 1st shift returned the highest total average score and engineers resulted lowest total average score. Employees with over 15 years' experience resulted in the highest total average score and

employees with 11 to 15 years' experience resulted in the lowest total average score. Rating 4 was the highest chosen selection.

Table 5

Question 2: Newer Employees Do Not Have the Mechanical Ability as Older Employees

Job Classification	n	0	1	2	3	4	5	Avg
Production (1st Shift)	15	0	0	1	5	5	4	3.80
Production (2nd Shift)	18	0	1	1	5	7	4	3.67
Production (3rd Shift)	15	0	0	0	9	6	0	3.40
Supervisor	16	0	0	1	5	8	2	3.69
Engineer	15	0	0	0	8	5	2	3.60
Manager	16	0	0	1	4	10	1	3.69
Total	95	0	1	4	36	41	13	3.64

Years' Experience	n	0	1	2	3	4	5	Avg
0 to 5	21	0	1	0	7	11	2	3.62
6 to 10	23	0	0	1	10	10	2	3.57
11 to 15	25	0	0	1	10	13	1	3.56
Over 15	26	0	0	2	9	7	8	3.81
Total	95	0	1	4	36	41	13	3.64

Table 6 displays the survey results from question 3, “the risk of not implementing changes to counteract the shift in the labor age at Company XYZ is significant and will impact the future success of the company.” The rating scale was 0, least agree, to 5, most agree. The average is the mean of the results grouped by the specific job classification or years' experience range. Managers resulted in the highest total average score and 3rd shift production employees resulted in the lowest total average score. Employees with 6 to 10 years' experience resulted in the highest total average score and employees with 11 to 15 years' experience resulted in the lowest total average score. The ratings 4 and 5 were the highest selected ratings for question 3.

Table 6

Question 3: There is a Significant Risk if Changes are not Implemented at Company XYZ

Job Classification	n	0	1	2	3	4	5	Avg
Production (1st Shift)	15	0	0	2	3	9	1	3.60
Production (2nd Shift)	18	0	0	3	3	3	9	4.00
Production (3rd Shift)	15	0	0	4	3	4	4	3.53
Supervisor	16	0	0	0	4	5	7	4.19
Engineer	15	0	0	2	0	5	8	4.27
Manager	16	0	0	0	1	9	6	4.31
Total	95	0	0	11	14	35	35	3.99

Years' Experience	n	0	1	2	3	4	5	Avg
0 to 5	21	0	0	1	5	9	6	3.95
6 to 10	23	0	0	2	3	4	14	4.30
11 to 15	25	0	0	5	4	9	7	3.72
Over 15	26	0	0	3	2	13	8	4.00
Total	95	0	0	11	14	35	35	3.99

Table 7 displays the survey results from question 4, “tools and automation have been implemented at Company XYZ as a strategy to counteract the shift in labor to the younger employees.” The rating scale was 0, least agree, to 5, most agree. The average is the mean of the results grouped by the specific job classification or years’ experience range. Engineers resulted in the highest total average score and 2nd shift production employees resulted in the lowest total average score. Employees with 0 to 5 years’ experience resulted the highest total average score and employees with 11 to 15 resulted the lowest total average score. Rating 3 was the most selected rating for question 4.

Table 7

Question 4: Tools and Automation have been Implemented to Counteract Shift in Labor

Job Classification	n	0	1	2	3	4	5	Avg
Production (1st Shift)	15	0	0	2	9	4	0	3.13
Production (2nd Shift)	18	0	1	7	7	3	0	2.67
Production (3rd Shift)	15	0	0	3	8	3	1	3.13
Supervisor	16	0	1	3	4	7	1	3.25
Engineer	15	0	0	1	5	9	0	3.53
Manager	16	0	0	1	8	6	1	3.44
Total	95	0	2	17	41	32	3	3.18

Years' Experience	n	0	1	2	3	4	5	Avg
0 to 5	21	0	0	5	6	8	2	3.33
6 to 10	23	0	1	2	10	10	0	3.26
11 to 15	25	0	1	6	11	7	0	2.96
Over 15	26	0	0	4	14	7	1	3.19
Total	95	0	2	17	41	32	3	3.18

Table 8 displays the survey results from question 5, “training methods and processes are important to help develop the mechanical ability in younger generations.” The rating scale was 0, least agree, to 5, most agree. The average is the mean of the results grouped by the specific job classification or years’ experience range. Production employees on 2nd shift returned the highest total average score and 1st shift production employees resulted in the lowest total average score. Employees with 6 to 10 years’ experience resulted in the highest total average score and employees with 11 to 15 years resulted in the lowest total average score. Rating 5 was the most selected rating on question 5.

Table 8

Question 5: Training Methods and Processes are Important to Develop the Mechanical Ability

Job Classification	n	0	1	2	3	4	5	Avg
Production (1st Shift)	15	0	0	0	9	4	2	3.53
Production (2nd Shift)	18	0	0	0	1	4	13	4.67
Production (3rd Shift)	15	0	0	4	2	3	6	3.73
Supervisor	16	0	0	1	5	6	4	3.81
Engineer	15	0	0	0	2	3	10	4.53
Manager	16	0	0	1	3	6	6	4.06
Total	95	0	0	6	22	26	41	4.07

Years' Experience	n	0	1	2	3	4	5	Avg
0 to 5	21	0	0	2	2	11	6	4.00
6 to 10	23	0	0	1	5	4	13	4.26
11 to 15	25	0	0	3	9	3	10	3.80
Over 15	26	0	0	0	6	8	12	4.23
Total	95	0	0	6	22	26	41	4.07

Table 9 displays the survey results from question 6, “standard operating procedures and other standardization methods are being used at Company XYZ to document tribal knowledge and teach the younger employees.” The rating scale was 0, least agree, to 5, most agree. The average is the mean of the results grouped by the specific job classification or years’ experience range. Engineers resulted the highest total average score and 3rd shift production employees resulted in the lowest total average score. Employees with 0 to 5 years’ experience resulted in the highest total average score and employees with 11 to 15 years’ experience resulted in the lowest total average score.

Table 9

Question 6: Standard Operating Procedures Are Being Used to Document Tribal Knowledge

Job Classification	n	0	1	2	3	4	5	Avg
Production (1st Shift)	15	0	0	5	6	4	0	2.93
Production (2nd Shift)	18	0	3	7	5	2	1	2.50
Production (3rd Shift)	15	0	0	6	7	2	0	2.73
Supervisor	16	0	0	5	7	4	0	2.94
Engineer	15	0	0	4	4	7	0	3.20
Manager	16	0	0	3	7	6	0	3.19
Total	95	0	3	30	36	25	1	2.91

Years' Experience	n	0	1	2	3	4	5	Avg
0 to 5	21	0	0	4	9	8	0	3.19
6 to 10	23	0	0	9	8	6	0	2.87
11 to 15	25	0	1	9	11	3	1	2.76
Over 15	26	0	2	8	8	8	0	2.85
Total	95	0	3	30	36	25	1	2.91

Conclusion

The lowest total average rating of each question was from one of the three production job classifications. The 2nd shift production employee classification resulted in the lowest total average score on three of the six questions. The engineer job classification resulted in the highest total average score on three of the five questions. Production employees on 1st and 2nd shift each had a high total average score for a question. Managers resulted in the highest total average score on one question and supervisors did not result in the top average score on any question.

The years' experience range of 11 to 15 years resulted in the lowest total average score on five of the six questions. The years' experience range of 0 to 5 years resulted in the highest total average score on three of the six questions. Employees with 6 to 10 years' experience

resulted in the highest total average score on two of the six questions. Employees with over 15 years' experience resulted in the highest total average score only on one question.

Chapter V: Discussion, Conclusion and Recommendation

The results showed that there was a need to continue to implement tools and technology to counteract the lack of mechanical ability with the younger generations entering the manufacturing setting at Company XYZ. Company XYZ has implemented a number of different improvement aids such as enhanced standard operating procedures and one-on-one training sessions. The risk of not implementing enhanced training aids and programs could result in a potential loss of labor skills and overall efficiency.

Discussion

The production employees shared that tools and standard operating procedures have not been effectively implemented at Company XYZ and had room to improve. The job classifications managers, supervisors, and engineers indicated that Company XYZ has implemented appropriate tools and automation to counteract the shift in mechanical ability throughout the younger generations. There is a difference in perception between the shop employees and the office employees regarding the effective actions implemented at Company XYZ to counteract the shift in mechanical ability in the younger employees. All of the groups believed that the risk of not implementing appropriate changes to counteract the shift in the labor to younger generations is evident and needs further attention to avoid losing the productivity and overall efficiency of the manufacturing processes at Company XYZ.

Managers believed that a new program called “Move to Manufacturing” will be successful in teaching younger employees the proper way to perform the needed mechanical tasks at Company XYZ while enhancing the technical experience of the employee. The program consisted of potential employees completing an online training session then a 20-hour workshop presenting an overview of the specific mechanical skills that will be used as an employee of

Company XYZ. Once the workshop was complete an interview was guaranteed for the individual with Company XYZ. If the individual was hired by Company XYZ both parties benefited from the 20-hour session of training. The individual received the benefit by starting day one at Company XYZ with 20 hours of experience and Company XYZ received the benefit based on the 20 hours of training not taking place during production time which could cause delays as the individual is less familiar with the processes. The program has had excellent reviews; however, it was still new and will need to continue to receive the appropriate resources and efforts to see the program implement success at Company XYZ over the next 5 to 10 years.

Training material was being used at Company XYZ to avoid relying on memory and create standardization, however the type of training material was not designed to aid younger employees. Younger employees preferred to watch videos or view a step by step visual overviewing the assembly of a part or process. The documents currently used at Company XYZ were standard operation procedures (SOP) in paper format which can be confusing and lacks the visual preferred by the younger generations. The paper format of the SOPs was also difficult to update and review compared to a video SOP or an automated system that provides the help needed to complete the step by step directions.

Training documentation was important, but employees at Company XYZ did not want to fully rely on using SOPs during their everyday task as they feel it will slow them down. The employees felt that it was more important to develop the employees through interactive training sessions on different tasks and topics. A potential risk is that the training sessions will take time away from the employee performing the needed daily tasks within production, however the ultimate value that the employee would receive through the developed training would be much more valuable to the employee and make them better for their career at Company XYZ. The

local technical college could be a potential to help with training employees to receive different ideas and opportunities outside of Company XYZ.

Conclusions

The results from the survey show that Company XYZ was aware of the need to continue to implement different programs and processes to counteract the shift in generations of the labor force at Company XYZ. Employees participating in the survey have provided examples of ways that Company XYZ had already started their action of counteracting the change in the generation such as using SOPs, a mentor program for employees to learn from an experienced employee, and additional required training for employees throughout their career at Company XYZ. By using the strengths of the younger generation that will be entering the workforce at Company XYZ, the company will focus their efforts on implementing tools developed with enhanced technology and automation to continue the overall success of the company.

Recommendations

The programs and processes that were currently being implemented at Company XYZ were addressing the potential risks of the labor shifting from experienced employees to younger employees with less of a mechanical ability. The programs need to continue to receive the attention and resources from senior management. It is critical to attain the knowledge from the experienced employees along with developing the younger employees into the future of the company. The culture at Company XYZ consists of an adaptive and proactive manner which has helped it to succeed throughout the years and also provides a confidence that the current traction to address the labor concern will be counteracted and will not affect the overall success of the future of Company XYZ. However, Company XYZ needs to continue to focus on the following areas: automation, advanced interactive training, classes, development programs, and a strong

mentor program to empower the employees to teach the younger generations the skills and traits of manufacturing. The survey results showed that there is a difference in perception between the shop employees and office employees in regards to how effective the proactive actions implemented at Company XYZ improved the training and onboarding of new employees. To eliminate the difference in perception between the shop and office employees it's critical to involve employees from all of the job classifications for the planning and implementing of new processes and initiatives at Company XYZ.

While automation has been implemented at Company XYZ though out every area of the business, the need to continue to learn of new automation opportunities will be what keeps Company XYZ ahead of their competitors. Allocating the needed funds and resources for automation has been and will need to be a priority to Company XYZ. Company XYZ will need to continue to send their employees to automation conferences to learn about the next and upcoming ideas. An area of improvement suggested by the production employees is to not send only office employees (managers, supervisors, engineers) to the conferences but to also send production employees to the conference. Sending production employees to the conferences will show that Company XYZ believes that the production employees are skilled and can add their input to the potential million-dollar investments within automation.

The development of employees at every stage of their career needs to continue to be a focus at Company XYZ. Onboarding employees and sending new employees to classes is extremely important, but it is also important to send the experienced employees to classes to focus on different areas of improvement such as leadership or team building. Employees with over six years of experience suggested that they would receive value from attending certain classes, but the focus at Company XYZ has been mostly on the employees within the first few

years of their career at Company XYZ. The classes could be internal classes in which an employee at Company XYZ performs a hands-on training demonstration. This would be an opportunity for employees to share different techniques or niches that they have learned throughout their career at Company XYZ. Sharing knowledge and experience is essential to teach the younger generations the best practices at Company XYZ. The “Move to Manufacturing” program has the potential to successfully onboard and teach new employees the needed tasks in an environment where the employee can focus on learning and not worrying about how fast they need to perform a task to keep up on a production line. The program needs to continue to receive the attention and allocated resources over the next several years if Company XYZ wants to attract and develop top skilled employees.

The topic that attracted the most need for improvement is in regards to the SOPs. Company XYZ have a wide variety of SOPs in a paper format. The paper format is not the best format for younger generations to follow and learn from. Video standard operation procedures would add more value to younger generations as the employees are more likely to follow the video rather than flipping through multiple documents. Using technology to create a standard operation procedure would also provide an easier way to update and have the live copy readily accessible for employees.

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Appendix: Survey Questions

Number of Years Working at Company XYZ:

Job Classification at Company XYZ:

Select the rating that you feel is most appropriate. The rating for questions 1-6 is scaled as 1 being “least agree” and 5 being “most agree”.

1. Company XYZ has combated the evolution of the mechanical ability through the generation change in a proactive manner. (1,2,3,4,5)
2. Company XYZ is challenged with younger employees lacking the mechanical ability to perform at the same level as previous generation employees. (1,2,3,4,5)
3. The risk of not countering the change in mechanical enhancement at Company XYZ is significant and will impact the future success of the company. (1,2,3,4,5)
4. Tools and automation have been implemented at Company XYZ to counteract the lack of mechanical enhancement in young generation employees. (1,2,3,4,5)
5. Training methods and processes are critical at Company XYZ to mitigate the lack of mechanical ability in younger generations. (1,2,3,4,5)
6. Standard operating procedures and other standardization methods are being used at Company XYZ to document tribal knowledge and teach the younger employees. (1,2,3,4,5)
7. What are some ways that Company XYZ can counter the change in mechanical ability to avoid possible short comings of the overall success of the company?
8. What types of tools and initiatives could be used to better improve the hands on training at Company XYZ?