

Practices and Characteristics That Inspire Innovation



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Abstract:

The US Patent and Trademark Office sought to create an innovation lab for rapid testing of implementation and impact of new ideas. The goal of this project was to recommend proven innovation practices for a USPTO Test Art Unit. We collected research on promising practices, and conducted interviews on the organization's culture. We compiled this information into rubrics that suggest what a good innovation culture looks like and what practices help achieve it. These are supplemented with a list of additional readings the USPTO can use to further inform their decisions.

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Executive Summary:

The USPTO fosters innovation, competitiveness, and economic growth through granting intellectual property rights. One form of intellectual property is a patent. Patents grant an inventor exclusive rights to their invention for up to twenty years. The goal of the USPTO is to provide high-quality patents and reduce the pendency of patents. Pendency is the life cycle of the patent from when it is first examined to the final decision. To reach their goals for quality and pendency, the USPTO frequently conduct pilot programs. Pilot programs are used to test new initiatives geared towards improving quality and pendency. These pilots are conducted over a six to twenty-four-month period and require a lot of resources. In order to more quickly test new ideas, the USPTO is considering building a Test Art Unit. The Test Art Unit is planned to be a controlled environment where 30 examiners can collaborate and identify impacts of new initiatives before reaching the pilot stage. This is to reduce the risk associated with how the current pilots are conducted and to produce better ideas overall.

Project Goal and Research Objectives:

The goal of this project was to provide the USPTO with resources that describe promising practices and characteristics of successful innovation labs to be adapted within the Test Art Unit. To achieve these goals, we have completed four research objectives

- 1. *Characterize the organizational culture present at the USPTO.*** We conducted interviews with USPTO examiners and management to better understand the organizational culture at the USPTO. The information we sought was how do examiners currently collaborate, what are the current channels of employee empowerment, how are employees kept motivated, and how effective is the communication structure at the USPTO.
- 2. *Identify key factors for an innovative culture.*** We conducted research into other organizations and scholarly articles that identified key factors of an organizational culture and experimentation culture. The information we sought were the commonalities between the companies and scholarly articles that identified what factors were needed to have a successful organization and experimentation culture.
- 3. *Identify and document practices shown to be successful in promoting innovation.*** We conducted research into companies with successful experimentation practices. We sought practices in five categories: collaboration, employee engagement, intake of ideas, testing ideas, and archiving ideas. These categories were based on the needs of the functionality of the Test Art Unit.
- 4. *Get USPTO's feedback on the findings.*** We conducted interviews with USPTO examiners, management, and executives to gain feedback on our work. The information we sought was how applicable were our identified practices and do our findings communicate the necessary information to understand our research.

Findings:

Our research revealed key factors of organization and experimentation culture, the current USPTO organizational culture, and successful innovation practices from other organizations.

- **Key Factors of Successful Organizational Culture:** We found that our research supports four key factors of a successful organization culture (Cabistan 2016, Coleman 2017). They are: a defined purpose, shared values, sharing information, and leadership support.
 - **Defined Goal:** The goal is the driving force behind every decision made at the organization. All decisions are made to further progress towards achieving the organization's goal.
 - **Shared Values:** The organization communicates a set of values that have been incorporated into the recruitment process for the organization. This creates a sense of community amongst the employees and a guideline of behavior and required mindset to achieve the goal.
 - **Sharing Information:** There is a defined structure of communication that consistently presents refined conclusions. Also, it presents results from departments as well as an explanation of how this information connects to the goal.
 - **Leadership Support:** Executives are actively involved with their employees. Employees are encouraged to speak up and give feedback to executives.

- **Key Factors of an Experimentation Culture:** Research suggests there are five key factors of a successful experimentation culture (Kwan 2018a, Kwan 2018b). They are: Establishing experimentation goals, leadership support, established experimentation environment, sharing information, and risk-taking and failure.
 - **Establishing Experimentation Goals:** The goal is high-level and aspirational embodying the mentality of testing ideas and gathering data to further the organization's understanding and provide a future direction.
 - **Leadership Support:** It is important for agency leadership champions and rewards innovation. Employees are regularly trained on creative thinking and employees have a clear defined channel by which innovative ideas can be directed to a panel of agency innovation champions.
 - **Established Experimentation Environment:** Leaders embrace diversity of thought, inclusiveness, and idea-sharing and is supported through collaboration, cross-team functionality and job rotation. The work environment encourages interaction with peers, customers, and internal and external networks of talent as opportunities for collaboration.
 - **Sharing Information:** Results from experimentations are reported and celebrated organization wide. The organization is mindful of information shelf-life and can effectively and efficiently use results towards progress.
 - **Risk-taking and Failure:** Creativity and innovation are now a foundation of key corporate values. Risk-taking behaviors and practices are driven top-down with the full support and endorsement of leaders. Innovative values and practices have become part of the organization's DNA.

Based on these factors we created an experimentation culture rubric. This rubric shows the progression of these factors at different maturity levels and highlights that the factors are building on themselves. It can be used to evaluate the Test Art Unit and other innovation labs outside the USPTO as well as be incorporated into the recruitment process for the Test Art Unit.

- **Characterizing Aspects of USPTO Organizational Culture:** Based on the results from the organizational culture rubric we found that the USPTO has a strong organizational culture, but with some room for improvements. For example, the results from pilots can more actively be shared amongst the organization and refined to give the important conclusions or possible directions from the pilots.

Organizational Culture Rubric			
Key Factors	Maturity Level 1	Maturity Level 2	Maturity Level 3
Defined Purpose	There is a purpose statement, but it is not communicated well within the organization. Or there is no purpose and it needs to be defined.	The purpose is understood within the organization and communicated to all employees. Clearly advertised through a written document or some other media. It is accessible to everyone in the organization.	The purpose is the driving force behind every decision made at the organization. All decisions are made to further progress towards achieving the organization's purpose.
Shared Values	The organization does not communicate its ideal mindset and desired behaviors to its employees. This can range from a set of shared values to standards the organizations expects.	The organization communicates a set of values that embody the organization. These values help create a guideline of behaviors and mindsets need to accomplish the organization's mission.	The values have been incorporated into the recruitment process for the organization. There is a sense of community amongst the employees.
Sharing Information	Information is not effectively communicated between individuals and departments. Results are kept within their respective departments and are not shared within the organization.	Results are beginning to be shared within the organization. Individuals and departments are beginning to be encouraged to share information. These results can be accessed by anyone in the organization.	There is a defined structure of communication that consistently presents refined conclusions and results from departments as well as an explanation of how this information connects to the purpose.
Leadership Support	Employees do not feel encourage/motivate. There is not active feedback between employees and executives, or feedback is not encouraged.	Executives help to motivate/encourage employees by delegation. Executives acknowledge the importance of feedback from their employees.	Executives are actively involved with their employees. Employees are encouraged to speak up and give feedback to executives.

- **Successful Innovation Practices:** We have researched other organizations and what their innovative practices are. We then created a maturity chart of these practices. This chart shows three levels of maturity of each category. The first level shows what practices will not require a lot of training and can be implemented easily. The second level shows the practices that need a strong foundation to work up to. The final stage shows practices that are operating at optimal conditions and are the goal to reach towards. Each practice is linked to a write up of the practice explaining the importance, implementation of the practice, and where to find further information.

Innovation Ecosystem Rubric			
Key Factors	Maturity Level 1	Maturity Level 2	Maturity Level 3
Established Experimentation Goals	There are no established goals, or these goals are not communicated to the organization.	The goals are communicated to the organization. Individuals understand the value of experimentation and how it is important to test ideas and gather data to make improvements.	The goal is high-level and aspirational embodying the mentality of testing ideas and gathering data to further the organization's understanding and provide a future direction.
Leadership Support	Agency leadership does not actively encourage a culture of innovation. When ideas are raised to management level, they linger in a state of limbo and are not acted upon.	Leaders are encouraged to provide mentors to employees that can help cultivate innovative thinking. There are open discussions on innovation and processes established to reward creative thinkers.	Agency leadership champions and rewards innovation. Employees are regularly trained on creative thinking and employees have a clearly defined channel by which innovative ideas can be directed to a panel of agency innovation champions
Established Experimentation Environment	Little education in innovation and creativity is provided to onboarding employee. Employees are not encouraged to generate both incremental and breakthrough ideas.	A culture of curiosity, creativity and innovation through continuous everyday learning supported by social and collaborative knowledge sharing is gradually established. Employees are coached to overcome unconscious bias and to recognize established habits that may stifle innovation.	Leaders embrace diversity of thought, inclusiveness, and idea-sharing is supported through collaboration, cross-team functionality and job rotation. Encourages interaction with peers, customers, and internal and external networks of talent as opportunities for collaboration
Sharing Information	Results from experiments are not effectively shared within the organization. Departments generally keep information within itself and is not shared with others.	Results are shared within the organization and can be accessed by anyone.	Results from experimentations are reported and celebrated organization-wide. The organization is mindful of information shelf-life and can effectively and efficiently use results towards progress.
Risk-Taking and Failure	A risk-averse environment exists, and new ideas are shut down. Employees do not believe they are free from reprisals if their ideas don't succeed.	Leaders encourage entrepreneurship and risk-taking. They take proactive steps to prevent an atmosphere of suppression and fear and build an environment of trust.	Creativity and innovation are now a foundation of key corporate values. Risk-taking behaviors and practices are driven top-down with the full support and endorsement of leaders. Innovative values and practices have become part of the organization's DNA.

Conclusion:

In this we summarize our findings and make conclusions and recommendations based on our findings.

- **Summary of Findings:** We concluded that having a strong organizational culture will help to create a strong experimentation culture. This is does not mean having a strong organizational culture will lead to an experimentation culture, there still needs to be a push to be innovative. This is due to the overlapping key factors of sharing information and leadership support. By having an established communication structure sharing results from experiments will be easier because all necessary channels of communication are already established. Leadership support is vital to both cultures because strong leaders are needed to keep employees engaged and directed. We found that the USPTO has a strong organizational culture, but with some room for improvements. For example, the results from pilots could be more actively shared. However, there are some points of strength such as the defined purpose and leadership support. Next, we created an experimentation culture rubric so the USPTO can see how the key factor mature and they can use it to evaluate themselves and other innovation labs. Finally, we conclude the importance of each category of practice researched.
 - **Collaboration:** We concluded from our research when collaboration is encouraged, work performance is increased. This is because effective collaboration helps to identify new angles to approach problems from.
 - **Employee engagement and empowerment:** When employees feel that their input is valued, they are found to be more productive at work.
 - **Intake of new ideas:** Many organizations utilize processes to generate ideas. These processes help employees be able to gather data and deciding what needs to be done.
 - **Testing new ideas:** Most organizations that we examined spend a lot of time and money into establishing how to test ideas and providing training for the

procedures. We also found the methodologies for testing new ideas follow five principles: Identify problem, generate solutions, implementation, testing, and recommendations.

- **Archiving and reporting data:** When storing data, it is important to note who is responsible for what information, confidentiality of information, and how it will be backed up.
- ***Practices that Promote Collaboration:*** The practice for collaboration are detailed in appendix D. Based on our research we concluded that these practices are suggestions that the USPTO can implement.
- ***Employee Engagement and Empowerment:*** These practices are detailed in appendix E. These practices help monitor the status of the Test Art Unit and provide useful data to the USPTO regarding the initiatives being tested.
- ***Intaking New Ideas:*** These practices are detailed in appendix E. Intaking ideas and engaging employees both rely heavily on surveys, many methods found in Employee Engagement can also apply to Intaking New Ideas.
- ***Testing Ideas:*** These practices are detailed in appendix C. These practices do not directly apply to the USPTO, however the USPTO can take inspiration from them. Each of these practices include methods for thinking and solving problems that the USPTO can adapt to the Test Art Unit with the goal of the USPTO establishing its own experimentation procedure.
- ***Archiving and Reporting Data:*** These practices are detailed in appendix F. These practices should potentially aid the USPTO to take inspiration from or to alter the current process they have.

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Section 1: Introduction

The US Constitution looks to protect the rights of US citizens, including the exclusive rights to inventions. Article 1 Section 8 Clause 8 of the US Constitution states Congress will have the power, “To promote the progress of science and useful arts, securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries”. This means the Congress has the power to grant protection for intellectual property rights for technological advances (USPTO.gov). To manage and provide protected intellectual property rights the United States Patent and Trademark Office (USPTO) was created in 1975 (USPTO.gov). One function of the USPTO is to issue patents after a rigorous patent examination process. Recently, the USPTO has been emphasizing improvements to pendency and quality of patents (USPTO 2018). Pendency is the life cycle of a patent from when it is first able to be examined to the final decision. Quality is the ability of a patent to protect the inventor in court (USPTO Strategic Plan).

The USPTO uses pilot programs to test and implement new initiatives for improving pendency and quality. These initiatives are ideas that USPTO executives come up with that are geared towards helping accomplish their goal of improved pendency and quality. Currently, the pilot programs at the USPTO are conducted assuming the idea will produce its desired result. However, pilot programs require a lot of testing, take a long time, cost a lot, require a lot of resources, and produce large amounts of data. Because of these factors, running a pilot has a large amount of risk associated with them. Risk means if the pilot is unsuccessful or ineffective it can hurt the USPTO because the desired result was not achieved. By assuming the initiative will simply work it adds onto the risk associated with pilots. This assumption removes any testing phase to determine the impacts the idea could have. Without understanding potential impacts there is no way to maximize desired results while minimizing negative effects. This does not mean running pilots is bad, it means there needs to be an improvement to mitigate the risk associated with them to help produce the desired result. To improve these programs the USPTO has devised the idea of a Test Art Unit (TAU). The purpose of a TAU will be to rapidly test initiatives in a controlled environment to provide feedback and identify impacts of proposed initiatives before implementing a pilot.

A TAU will be a collaborative environment of 30 patent examiners focusing on evaluating components of the initiatives (USPTO.gov). Some examples of testing topics are: production options, policy and guidance changes, and employee engagement and satisfaction (USPTO.gov). The project team was tasked to provide the USPTO with resources that describe promising practices and characteristics of successful innovation labs to be adapted within the Test Art Unit.

The goal was achieved with four objectives. First, we characterized the culture that is currently present at the USPTO. We then found key factors of an innovative culture. Then the team identified and documented practices that had been shown to be successful in promoting innovation. Lastly, the team got feedback from the USPTO about practices and characteristics found from their research. This aided the team to know which practices were the most applicable to the USPTO. From the team’s research and findings, they were able to create a document that described all applicable researched practices.

Chapter 2: Background

In this chapter, we first discuss the history and purpose of the United States Patent Office. We then proceed to describe the past and present patent office examination procedures. Furthermore, we describe what exactly innovation labs are and what they entail. We give examples of innovation labs in other successful organizations. Moving forward, we present the past attempts the patent office has undertaken to solve the current innovation lab challenge, while also speaking upon why this challenge is important not only to the patent office but to the U.S economy and progress of innovation.

2.1: The USPTO

The USPTO enforces one of the objectives established by the Constitution. Article 1, Section 8. The purpose is to protect the intellectual property of innovators. The purpose of the USPTO is to foster economic growth and innovation in the United States. The organization achieves this by granting allowances of high-quality patents that protect the intellectual property for inventors (USPTO, Strategic Plan, 2018). The USPTO is a hierarchical organization, but for the sake of patent examination, the biggest difference is between those with and without signatory authority. (POPA) Signatory authority is when an examiner can sign off as the USPTO without a supervisor reviewing their work to grant a patent allowance.

2.2: Patent Examination Process

There are two factors that the USPTO considers when reviewing their process. These are the quality and pendency of each allowance. The quality of a patent is determined by whether or not it can withstand a legal challenge (WIPO, "Quality of patents"). For each patent that is approved, there is a first-order action, which is when the application can be first examined, and an allowance which is when the final decision is made. The pendency of a patent is the time it takes for it to be granted an allowance. As of 2015, the average traditional pendency of a patent was 26 months (USPTO, "Pendency of Patent Applications " 2018). The USPTO hopes to improve its pendency in the coming years through a variety of initiatives and pilots (USPTO, "2018-2022 Strategic Plan").

Before a decision is released to the inventor, the examiner contacts them multiple times. When a patent application is rejected, the inventor has a chance to appeal the outcome. During an appeal, they are allowed to edit their applications to be more specific (USPTO, "MPEP", 2018). During the first rounds of review, most applications are rejected. However, when that decision is appealed, almost three-fourths are accepted. If the applications are rejected in the second round and are appealed again, it was found that one-fifth of them were accepted and issued a patent (Lemley, 2009).

An alternative way to appeal without editing a patent application is to have an interview with an examiner. During this interview, applicants can talk about their rejection and elaborate on their invention. People who take this option have a higher chance of having their applications approved. Inventors get a chance to clarify details of the invention. Most often, this helps prove their claims leading the inventor being granted a patent (Lemley, 2009).

2.3: Innovation Labs

Innovation labs often are created with the intent of solving major problems. The sizes of these innovation labs can range from small groups to entire companies. A large innovation lab is Google's offshoot "X", a moonshot factory, that focuses on the world's biggest problems has hundreds of employees ("X – The Moonshot Factory"). On the other hand, many college campuses contain teams of less than a dozen graduate researchers developing breakthrough products every year ("Innovation Centers and Partners").

2.4: Innovation Lab Examples

With the wide variety of innovation labs, many companies have created their own approaches to how they should function. Google, for instance, gives each of its employees one-fifth of their total time on the clock to pursue their own projects. This time is generally unstructured and the scope of the innovation is self-contained within Google (Robinson, 2018). This gives their employees time to work on company-related, or company benefiting passion-projects. Some of the greatest achievements of this policy are Google News, and most notably, Gmail (Robinson, 2018). Google also has constructed "X," a company-sized innovation lab. Their projects range from using balloons to give internet to remote regions, VR technology, and package delivery drones ("X – The Moonshot Factory"). Other notable companies with award-winning innovation labs are HP, Xerox, Microsoft, IBM, and Cisco (CB Insights, 2018). IBM Research, in particular, was the world's first corporate laboratory focused solely on scientific research (CB Insights, 2018).

2.5: Previous USPTO Innovation

In the past, rather than producing an innovation lab of its own, the USPTO had outsourced its work in the form of challenges. For instance, while working with NASA the USPTO helped them develop the Center for Collaborative Innovation. The lab they created was a place where they could develop new tools for the USPTO's processes. At the center, they offered a \$50,000 prize to any team that could provide an algorithm that would match details in patent applications with corresponding page numbers (Steffen, 2011). This will help prevent examiners from needing to flip through an application to find necessary information. To help with this, art units are designed to streamline the examining process by letting examiners specialize in what are called "arts". Each "art" is a highly specific category of technology of which the examiners are experts in their field. Every art unit has a supervisor and both senior and junior examiners to review applications in their category. However, the hundreds of thousands of applications mean that the USPTO rarely has enough examiners to get through applications in an expedited fashion (Steffen, 2011).

In addition, the USPTO undertakes numerous initiatives in an attempt to improve the efficiency of its process. These pilot programs are long-term commitments of the USPTO's resources. The USPTO had told applicants that they needed a glossary of terms to complete their patents quicker. Promising these applicants that if they provided a glossary of terms defining their application they would be moved to the front of the line to have their patent reviewed (USPTO, "Glossary Initiative", 2016). However, it became evident that applicants abused these

incentives and started turning in glossaries that were not meeting the standards of the patent office. Once they handed in these sub-par glossaries, they expected to be moved to the front of the patent priority line. This pilot demonstrated the need for a TAU to field-test ideas before releasing them to the core.

2.6: Why an Innovation Lab?

With each group of examiners specializing in different patent categories, disrupting the flow of work by moving examiners onto different programs or categories for the sake of initiatives disrupts the status quo and can affect the pendency of applications. One of the ways to prevent this is for the USPTO to work with other companies or outside organizations. However, this does not guarantee results. In the 2011 U.S. Patent and Trademark Office Algorithm Challenge, only 30% of more than 230 teams ended up submitting a final product for review (Riedl, 2012). As a result, the USPTO wishes to have an internal lab.

To solve these problems efficiently, and to have more control over the results, the USPTO wants to create an innovation lab of its own. This lab's focus is solely on improving the practices and methods of patent examination. Using a small group of examiners, a Test Art Unit will be created to develop new ideas and strategies (USPTO). Research on what examiners believe will best serve the agency was essential in constructing the criteria and guidelines for the project (Gryszkiewicz, 2016).

Chapter 3: Methodology

The USPTO wants to create an innovation lab with the purpose of rapid testing of the implementation and impact of new ideas within the USPTO. The goal was to provide the USPTO with resources that describe promising practices and characteristics of successful innovation labs to be adapted within a Test Art Unit. These practices have come from a variety of industries such as banking, financial, product development, etc. These practices will help in testing different ideas of different natures. To achieve this goal, four research objectives were identified along with research questions.

- Characterize the organizational culture present at the USPTO
- Identify key factors for an innovative ecosystem
- Identify and document practices shown to be successful in promoting innovation
- Identify USPTO's feedback on the findings

These practices are a list of recommendations on how to test and measure ideas as well as the type of culture the Test Art Unit should have to inspire innovation. In this chapter, we discuss the methods used to accomplish and analyze these objectives.

Section 3.1: Characterize the organizational culture present at the USPTO

Our first research objective was to characterize the culture present at the USPTO. To accomplish this objective, two research questions were created:

- What are the common key factors of a successful organizational culture?
- What is the current state of the organizational culture at the USPTO?

We first researched what key factors make up a successful organizational culture. We read through multiple scholarly articles and journals. From our readings, we pinpointed the key factors that occurred across multiple papers. To find the current state of the organizational culture at the USPTO, we conducted interviews with USPTO personnel. This information was determined by conducting interviews with three USPTO personnel, two of which were statisticians and one was a patent examiner. We had created an interview protocol and a list of questions pertaining to the current culture at the office.

Interviews were carried out in accordance with the suggestions made by Shazia Jamshed from her paper on the Methodology of Semi-Structured interviews (Jamshed, 2014). In each case, a series of questions will be prepared before the interviews to lead the conversation. The interviews will be semi-structured, meaning some answers may lead to other questions being asked that were not originally prepared. All interviews will be anonymous to protect the participants and ensure that they are free to answer the questions honestly. The interview

protocol is under Appendix A. These interviews will be analyzed using Flick’s method (Flick, von Kardorff, & Steinke, 2004)

The answers we received from each of the employees, were recorded and analyzed to document the characteristics. These criteria were taken and developed into a rubric.

Section 3.2: Identify key factors for an innovative ecosystem

Our second research objective was to determine the key factors of an innovation ecosystem. To accomplish this objective one research objective was created.

- What are the common key factors of an innovation ecosystem?

We researched the key factors of an innovation ecosystem by reading scholarly articles and journals. From synthesizing our readings, we discovered that there were factors that occurred more frequently. We determined these components to be the most crucial and documented them. These criteria were taken and developed into a rubric.

Section 3.3: Identify and document practices shown to be successful in promoting innovation

We next researched practices that were shown to be successful in promoting innovation. From speaking with USPTO personnel, they had identified five categories that needed research. Those categories were ideation, testing ideas, improving collaboration, monitoring engagement, and archiving and reporting data. For each of the categories, promising practices that have been successful at other organizations were documented.

For this objective. our research consisted of reading several scholarly articles and journals. When we found some that seemed intriguing and applicable to the USPTO, we synthesized them. From our analyses, we were able to comprehend how other organizations implement various practices to make themselves more innovative and successful. For each category that was identified, key factors were recognized. These factors were documented and developed into a rubric.

Section 3.4: Identify USPTO’s feedback on the findings

After we found a number of practices that the team was satisfied with the rubrics that were developed were taken to the employees at the USPTO and their opinion and feedback on them were requested. This objective was driven by the following research questions:

- How do the chosen practices align with the USPTO culture?
- Will these practices work in a USPTO setting?

The purpose of requesting feedback is so that what we have researched and found is effective for the USPTO. This feedback was confirmed that the practices that have been identified will work when used in the Test Art Unit. The employees were provided with descriptions of the practices. The descriptions include a general overview of the practice, the equipment required, and the culture surrounding the practice. The purpose of this interview was to have the interviewee understand how the practice works and then get their thoughts on how this practice could be done at the USPTO.

Chapter 4: Findings

In this chapter, we first describe the key factors of successful organizational and experimentation cultures. We discuss that an organization with a culture that embraces testing and learning fosters a successful culture of experimentation. Next, we characterize the culture at the USPTO based on the identified key factors. We discuss how the culture at the USPTO compares to a successful experimentation culture. After this, we explore proven innovation practices from successful organizations. We refine our findings with feedback from USPTO employees with USPTO employees to incorporate their feedback on our findings and recommendations. These findings assisted in identifying how an experimentation culture matures and becomes successful. They also identified successful practices that serve as suggestions for experimentation processes.

4.1 Key factors of successful organizational cultures

Research into successful organizational cultures revealed four key factors for an effective organizational culture. These key factors are a defined purpose, shared values, effective communication, and good leadership (Cabistan 2016, Coleman 2017, Wojcicki 2011). There are other factors that influence the effectiveness of an organizational culture; however, these are the ones that were common in different organizations.

Defined Purpose: A defined purpose is important for an organizational culture because most employees like to know the “why” behind what they are doing (Cabistan 2016, Coleman 2017). This defined purpose generally takes shape as a mission statement. An organization’s mission statement communicates the driving force behind that organization’s existence. For example, the mission statement from Google, “Our mission is to organize the world’s information and make it universally accessible and useful” this clearly communicates Google’s bigger picture and why they are a company. Another example of this is SpaceX, “SpaceX designs, manufactures and launches advanced rockets and spacecraft. The company was founded in 2002 to revolutionize space technology, with the ultimate goal of enabling people to live on other planets”. In addition to explaining the “why” behind an organization, a mission statement helps to orientate employee decisions (Coleman 2017). Every decision made should link back to the mission statement and in some way progress the organization towards their goal.

Shared Values: Defining a purpose also leads to establishing shared values in the organization. An organization should communicate to its employees a set of values that embody the organization. By establishing these values the organization communicates a guideline on the behaviors and mindsets needed to achieve their mission (Cabistan 2016, Coleman 2017). One example of a company that communicates its shared values is Adidas. Adidas communicates on their website that, “Every day, we come to work to create and sell the best sports and fitness products in the world, and to offer the best service and consumer experience” this statement communicates what Adidas’s values are. They want employees that are committed to creating and improving Adidas’s products as well as helping to create a great customer experience (Adidas). By establishing strong values, a community will be created inside the organization. This community will help people to identify with an organization and help retain employees (Cabistan 2016, Coleman 2017, Monster.com). To help create this community, many

organizations have incorporated their values into their recruitment process. Coleman (2017) and Ellis (2013) claim by incorporating values in the recruitment process an organization will be able to recruit talented individuals that will work well within their organization and retain them.

Sharing Information: Both the first key factors of organizational culture rely on communication. To have a successful organizational culture it needs to have effective communication between employees and executives or management. According to a study from Google called Project Aristotle, Google identified success factors of team dynamics. One of these success factors was called, “Equality in distribution of conversation turn-taking” (Duhigg 2016). What Project Aristotle determined is a team that lets everyone speak equally is more successful than those that do not (Cabistan 2016, Duhigg 2016). By allowing everyone to speak equally in a group the overall performance increased yielding better results. Even further the Aristotle group found that psychological safety was the most critical factor for an effective team. Psychological safety is achieved when people feel they will not be judged by others in a group for their ideas (Duhigg 2016). These factors also apply to organizations because employees need to feel that they can talk and communicate their ideas. When teams can communicate effectively and equally they tend to be more successful and collaborative (Cabistan 2016, Duhigg 2016).

Leadership Support: Good leadership is the cornerstone of a strong organization (Cabistan 2016, Govindarajan 2014, Goward 2019). In another study conducted by Google called Project Oxygen, they identified eight characteristics that make effective managers. The study determined a good manager is one that can coach their team, give and receive feedback, and communicate effectively with their team (Project Oxygen). By exhibiting these three traits a leader can help to nurture their employees and make them better. When leaders take a personal interest in their employees, those employees end up being more engaged and ultimately the other factors discussed thrive (Cabistan 2016, Ryden 2017, Project Oxygen).

4.2 Key Factors of an Experimentation Culture

Research into successful experimentation cultures had revealed five shared key factors. These key factors are: establishing experimentation goals, executive participation, communicate an experimentation protocol, sharing information, and willingness to fail (Kwan 2018a, Kwan 2018b, Govindarajan 2014, Wojcicki 2011, Goward 2019).

Establishing Experimentation Goals: Govindarajan (2014) and Kwan (2018b) both argue that creating a culture of experimentation first needs a vision that communicates the goals of experimentation within the organization. They both also claim this vision should be high-level and aspirational embodying the mentality of testing ideas and gathering data (Govindarajan 2014, Kwan 2018b). The basis of an experimentation culture is having the mentality of generating ideas and testing them to determine if they work. In an article by Susan Wojcicki, CEO of YouTube, she discusses the decision-making process for Google when trying to determine how many links to show on a page. She explains that initially, Google showed 10 links because that is what they thought was good. Later, they did a small experiment to see if customers wanted ten, twenty, or thirty links. Almost unanimously the customers said they wanted thirty, but when it was tested it came out that really ten were desired. It turned out that loading thirty links was slower and what customers really wanted was speed (Wojcicki 2011).

This story highlights the importance of testing ideas and gathering data. Because Google decided to test their idea they learned more about their customer's desires and are better equipped to change and meet customer demands.

Leadership Support: Another important aspect of developing an experimentation culture is having executive participation. To get the organization to buy-in on experimentation first the senior level management and executives need to believe in the benefits of experimentation (Kwan 2018b, Govindarajan 2014). These leaders should believe in experimentation and actively participate in it. One example of leadership support is Thor Ernstsson, CEO of Alpha. In his article, *How to Foster a Culture of Experimentation in Your Organization*, Ernstsson outlines why he believes innovation is important and how organizational leaders should support experimentation for successful innovation. He elaborates that as an executive he took up the experimentation mentality and actively started encouraging and participating in it (Ernstsson 2019). By having leaders actively participate, it can create momentum amongst the organization that will help turn everyone towards experimentation (Kwan 2018b). Executive participation also increases the effectiveness of experimentation groups. In a 2019 research report by Widerfunnel, it was reported that organizations that have experimentation driven by executives are five times as likely to use experimentation to eliminate gut-feeling decision-making and optimize the customer journey as organizations that do not have executive participation. Also, these organizations are four times as likely to pursue experiments that maximize organization impact, increasing sales and customer lifetime value (LTV) (Goward 2019). Goward (2019) concludes leadership support in the experimentation process results in more strategic organizational goals.

Communicate an Experimentation Protocol: Another key factor for an experimentation culture is creating an experimentation protocol. This protocol should explain the methodologies used, how experiments will be developed, how the results will be analyzed, understood, and leveraged (Kwan 2018a, Kwan 2018b). Even with an established protocol employees will need to be trained in its operation. Kwan (2018b) claims the training should clarify key deliverables, when approval is needed, when other team contributions are welcomed, and a feedback loop. It should also identify the tools, frameworks, and technologies available to the experimentation teams (Kwan 2018b). The purpose of clarifying all these protocols is to make sure experimentation can run smoothly also to communicate to the organization departments why the organization is testing, how the tests are conducted, and when different departments can contribute (Kwan 2018b).

Sharing Information: An important mentality for any organization to have is effective knowledge sharing. Departments should be communicating to each other about the knowledge they have gathered to inspire new ideas and more collaboration. By spreading experimentation results throughout the organization it can fuel other team's initiatives (Kwan 2018b). Something to consider for information sharing will be the speed at which information can be communicated. Information has a shelf-life and the more fluid the internal communication is the more likely it will be accessed and used (Kwan 2018b). Susan Wojcicki identifies a possible way for information sharing inside a large organization. She explains that the employees at Google know almost as much as the Board of Directors do because of their information sharing strategy. Every quarter the Board Letter gets shared with all 26,000 employees and the same slide show from

that meeting. This is in an attempt to get everyone's perspective on ideas and possible re-interpretations that can be experimented with (Wojcicki 2011).

Risking-taking and Failure: Another important mentality to establish for an experimentation culture is the willingness to fail. One example of an organization that uses failure to their advantage is IBM. Thomas J. Watson Sr., the founder of IBM, said, "The way to succeed is to double your failure rate" (IBM 2017). Thomas Watson actively used this mentality during his time with IBM. Greulick (2019) recounts an interaction between Thomas Watson and a salesperson that failed to make a critical deal. Instead of firing the salesperson Watson gave them a chance to explain why they had failed and how to do better next time and the salesperson delivered. The highlight of this story is to show that while failure is undesirable it is important to learn from failure when it occurs so it will not happen again. Cannon & Edmondson (2005) define organizational failure as, "Deviation from expected and desired results" this means failure can be both positive and negative, but in both cases, there is a lesson to be learned. Failure is at the heart of experimentation, the reason for running experiments is to make mistakes and continuously learn from failure. Data obtained from failed experiments still holds value for an organization because it can yield a new direction and at the very least identify what direction not to pursue (Govindarajan 2014, Wojcicki 2011, Kwan 2018b). Cannon & Edmondson (2005) support the value of failure and identify for an organization to learn from failure the leadership first need to create an environment that does not penalize reporting negative deviations. It is further elaborated that failure requires an environment of inquiry and openness that promotes deep-thinking and reflection (Cannon & Edmondson 2005). If an organization is afraid to fail they will miss out on the opportunities that failure presents. Another aspect of failure is an organization's ability to respond to failure. Susan Wojcicki (2011) explains that when a failure occurs the lesson there needs to be learned quickly and corrected accordingly. Catalano (2018) and Edmondson (2011) support that failure requires a structured protocol to identify and analyze failure. This is supported by Cannon & Edmondson (2005) which proposes a three step structured system of failure.

After establishing these key factors an experimentation culture rubric was created. This has a similar objective to the organizational culture rubric where it shows the progress of each factor at three maturity levels. This rubric is presented below.

Innovation Ecosystem Rubric			
Key Factors	Maturity Level 1	Maturity Level 2	Maturity Level 3
Established Experimentation Goals	There are no established goals, or these goals are not communicated to the organization.	The goals are communicated to the organization. Individuals understand the value of experimentation and how it is important to test ideas and gather data to make improvements.	The goal is high-level and aspirational embodying the mentality of testing ideas and gathering data to further the organization's understanding and provide a future direction.
Leadership Support	Agency leadership does not actively encourage a culture of innovation. When ideas are raised to management level, they linger in a state of limbo and are not acted upon.	Leaders are encouraged to provide mentors to employees that can help cultivate innovative thinking. There are open discussions on innovation and processes established to reward creative thinkers.	Agency leadership champions and rewards innovation. Employees are regularly trained on creative thinking and employees have a clearly defined channel by which innovative ideas can be directed to a panel of agency innovation champions
Established Experimentation Environment	Little education in innovation and creativity is provided to onboarding employee. Employees are not encouraged to generate both incremental and breakthrough ideas.	A culture of curiosity, creativity and innovation through continuous everyday learning supported by social and collaborative knowledge sharing is gradually established. Employees are coached to overcome unconscious bias and to recognize established habits that may stifle innovation.	Leaders embrace diversity of thought, inclusiveness, and idea-sharing is supported through collaboration, cross-team functionality and job rotation. Encourages interaction with peers, customers, and internal and external networks of talent as opportunities for collaboration
Sharing Information	Results from experiments are not effectively shared within the organization. Departments generally keep information within itself and is not shared with others.	Results are shared within the organization and can be accessed by anyone.	Results from experimentations are reported and celebrated organization-wide. The organization is mindful of information shelf-life and can effectively and efficiently use results towards progress.
Risk-Taking and Failure	A risk-averse environment exists, and new ideas are shut down. Employees do not believe they are free from reprisals if their ideas don't succeed.	Leaders encourage entrepreneurship and risk-taking. They take proactive steps to prevent an atmosphere of suppression and fear and build an environment of trust.	Creativity and innovation are now a foundation of key corporate values. Risk-taking behaviors and practices are driven top-down with the full support and endorsement of leaders. Innovative values and practices have become part of the organization's DNA.

Figure 1. Shows the Innovation Ecosystem Rubric

4.3 Characterizing Aspects of USPTO organizational culture

After defining the key factors of organizational culture we created an organizational culture rubric. This rubric is presented below and is read the same way the innovation culture rubric is.

Organizational Culture Rubric			
Key Factors	Maturity Level 1	Maturity Level 2	Maturity Level 3
Defined Purpose	There is a purpose statement, but it is not communicated well within the organization. Or there is no purpose and it needs to be defined.	The purpose is understood within the organization and communicated to all employees. Clearly advertised through a written document or some other media. It is accessible to everyone in the organization.	The purpose is the driving force behind every decision made at the organization. All decisions are made to further progress towards achieving the organization's purpose.
Shared Values	The organization does not communicate its ideal mindset and desired behaviors to its employees. This can range from a set of shared values to standards the organizations expects.	The organization communicates a set of values that embody the organization. These values help create a guideline of behaviors and mindsets need to accomplish the organization's mission.	The values have been incorporated into the recruitment process for the organization. There is a sense of community amongst the employees.
Sharing Information	Information is not effectively communicated between individuals and departments. Results are kept within their respective departments and are not shared within the organization.	Results are beginning to be shared within the organization. Individuals and departments are beginning to be encouraged to share information. These results can be accessed by anyone in the organization.	There is a defined structure of communication that consistently presents refined conclusions and results from departments as well as an explanation of how this information connects to the purpose.
Leadership Support	Employees do not feel encourage/motivate. There is not active feedback between employees and executives, or feedback is not encouraged.	Executives help to motivate/encourage employees by delegation. Executives acknowledge the importance of feedback from their employees.	Executives are actively involved with their employees. Employees are encouraged to speak up and give feedback to executives.

Figure 2 shows the Organizational Culture Rubric

This rubric includes the organizational culture key factors and three maturity levels. The maturity levels show that there is a progress of each of the key factors and that they build on each other. This rubric describes how each key factor is implemented at each level of maturity. Using this rubric we asked several USPTO employees to evaluate the USPTO on each key factor. The rubric is in appendix B.

Defined Purpose: The defined purpose was evaluated by the USPTO employees to be between maturity two and three. This suggests that the USPTO has a purpose statement, but not every decision is directly related to the mission statement.

Shared Values: The shared values at the USPTO were generally evaluated at maturity level two. This means the USPTO communicates shared values and standards to its employees, but it is not necessarily incorporated into the recruitment process.

Sharing Information: Sharing information was evaluated usually at a two. This means the results from other departments are shared and can be accessed, but are not necessarily refined conclusions or actively shared amongst the organization. One example of results being published, but not actively shared would be the pilot programs. Every pilot can be found at the USPTO website with data and some conclusions. However, not all pilots are actively shared and presented to the USPTO employees. Actively sharing can mean an email to everyone, a presentation, etc.

Leadership Support: Leadership support was evaluated at a three. The USPTO employees felt that the executives and management make an effort in communicating and supporting their employees.

4.4 Successful Innovation Practices

In this section we discuss proven innovative practices from successful companies and organizations. The practices are broken down by the categories listed below. Each category has an explanation of the types of practices in it, how they relate to innovation, and how they relate to the USPTO. Each of the following categories will compare and identify trends between practices.

4.4.1 *Improving Collaboration and Team Dynamics*

Collaboration among employees is essential for a team to be effective. Deloitte did a survey with over 7,000 participants in 130 countries and found teamwork to drive the current global workforce. Participants shared that there has been at least a 50% increase of time used on tasks related to teams (Lacerenza, Marlow, Tannenbaum, & Salas, 2018). In the Test Art Unit that is being created, the USPTO wants to test collaboration and see if it helps their examiners be more productive.

In this Test Art Unit, thirty examiners will be put into teams. Within teams, each member should be comfortable with each other. Only then will everyone be able to share ideas and opinions freely without fear of ostracization (Lacerenza, Marlow, Tannenbaum, & Salas, 2018). To improve interpersonal relationships, many companies have taken initiatives to implement this in their workplace. Sanofi holds an annual SanofiFest that takes employees out of their normal offices and encourage them to mingle with each other (Ashfield Meetings & Events, 2019).

Ultimate Software has implemented a program called CoffeeChats in which employees that usually work on-site get paired up with an employee who tends to work at home. They spend thirty or so minutes talking about productivity, time management, and their personal lives over coffee (Russell, 2019).

In the 1970s, the president for Intel put Objectives and Key Results (OKR) into effect and it became very popular with companies such as Google, Twitter, etc. (Weekdone, n.d.). Intel defined OKRs as “a critical thinking framework and ongoing discipline that seeks to ensure employees work together, focusing their efforts to make measurable contributions that drive the company forward.” It has objectives to show the qualitative goals and results to quantify and measure how the goal was accomplished (Niven & Lamonte, 2017). This will help each member set goals for themselves and for their team. They need to determine what objectives will be necessary to obtain by each meeting and also by the end of the program (Lacerenza, Marlow, Tannenbaum, & Salas, 2018).

Once the goals are decided, everyone’s role should be identified. This way, the members will know how they will contribute to the team. When everyone knows what they have to do, they will have a clearer aim in completing the project (Lacerenza, Marlow, Tannenbaum, & Salas, 2018). A way to distribute roles can be achieved by queuing. Queue theory, according to iSixSigma, “is a branch of operations research because the results often are used when making business decisions about the resources needed to provide service” (Sherman, 2013). Rite Aid released a program in which if they cannot fill up a customer’s prescription in fifteen minutes, the customer is given a \$5 Rite Aid gift card. The purpose of this endeavor was to decrease the amount of time customers had to wait in line for their medications. Knowing that Rite Aid employees are actively trying to swiftly fill up medications makes customers not worry if the wait ends up being longer. The technician first gets all of the patient’s information and then checks the availability of the customer’s desired prescription in the inventory. The pharmacist checks if the customer’s information matches the patient needing the medicine and then fills the bottle. Then the technician gets the customer’s signature and payment and hands off the medicine to them (Sherman, 2013).

These are just some of the practices that have been found to be helpful in improving collaboration and team dynamics. More practices can be found in Appendix B.

4.4.2 Monitoring Engagement

High levels of employee engagement are commonplace in successful organizations. To achieve engagement, organizations empower their employees. They do this by giving them additional responsibility and the authority to make decisions along with opening channels to provide feedback. (Burke & Miles, 2019) Engaged employees are more productive, take less time off, and have significantly lower turnover rates than those who feel undervalued (Lockwood, 2007).

The benefits engaged employees provide to companies are highly desirable. For instance, as a direct result of increasing employee engagement the construction company Caterpillar

documented a “70% increase in output in less than four months” at one plant and millions of dollars in savings at others. This was attributed to the increase in morale that came from empowering employees and the decrease in time off that engaged employees took (Lockwood, 2007).

Keeping employees feeling engaged and empowered is a constant process that organizations need to maintain. Employee engagement was found most effective when work and opinion felt valued (Lockwood, 2007). Employees cared most about whether or not they felt they had the necessary resources to complete their job and whether their supervisors recognize their accomplishments and value. Importantly, employees need to feel their opinions matter and were taken into consideration when the organization made decisions.

To determine the answers to these questions many top companies such as Amazon, Apple, and Microsoft deploy regular surveys to their employees (Burke & Miles, 2019). This has the dual benefit of empowering employees with a channel to provide feedback while also quickly informing executives and supervisors of any immediate problems facing their workforce. An issue facing this method is what is known as survey fatigue, when companies or organizations survey the same people too frequently the participation rate drops below 50% (Crowell, 2019). This happens when employees see that their previous feedback hasn’t been implemented, making them believe their opinion is valued less by the organization. Through interviews, we know that the USPTO currently has the problem of participation in their surveys. To prevent this fatigue, it is important that an organization only asks for feedback as quickly as they can implement it (n.a, Kaizen, 2018).

4.4.3 Intake of Ideas

Generating ideas is crucial for promoting innovation, but ideas alone cannot solely be utilized, there needs to be a process attached to it. There needs to be a technique that efficiently aids the generation of ideas. Brainstorming randomly with no set procedure has been proven to actually result in fewer ideas being generated (Kylliäinen, 2019).

There is a seven-step ideation technique called SCAMPER. It stands for Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, and Reverse. These are also steps to follow this procedure. McDonald’s also has used these techniques as well. They used the “Put to another use” step to sell real estate and restaurants and not only food. Then they used the Eliminate step to remove the cost of hiring writers and have everyone serve themselves. Another step that is used is Reverse by having people pay for their food before they get it, instead of paying after they eat (Dam, R., & Siang, T., 2017).

Another method to ideation is reverse brainstorming. A person who was in charge of a health clinic, Luciana, was tasked to improve customer satisfaction. But her team felt overworked and ideas seemed to be minimal. So she thought of taking her goal and reversing it. So instead of “How do we improve patient satisfaction?”, she flipped it to be “How do we make patients more dissatisfied?” Whatever answer was resulted from this new question was something they should not do. So their objective became how to improve their clinic by making sure what they brainstormed does not come true (Mind Tools, 2018).

4.4.4 Testing Ideas

Effective methods of testing new ideas are essential for innovation. Much like intake of new ideas, constantly testing them is equally as important for growth. Companies pour their resources into R&D for this very reason (Skillicorn, 2019). The more companies strive to innovate and test new ideas the more competitive they tend to be.

Through our research, we found that practices for testing ideas follow five basic principles (Knapp 2016, Thomke 2003, Davenport 2014). The principles are: Identify a problem, generate solutions, implementation, testing, and recommendations.

Identify Problem: The purpose of this step is to look at the service or product that the organization provides and identify one area to improve. Then a specific target needs to be picked. Knapp (2016) suggests picking both a specific problem in one area and a specific customer. Thomke (2003) suggests a different approach to identifying multiple problems and prioritizing them. This step can take multiple forms but what these processes have in common is starting by identifying a problem.

Generate Solutions: The purpose of this step is to create solutions for the identified problem. Knapp (2016) suggests creating a team with diverse skills and knowledge to generate the most informed and knowledgeable solution possible. Thomke (2003) supports by explaining Bank of America created a team devoted to creating solutions and creating testing them. Davenport (2014) and Thomke (2003) both suggest this solution should outline the process as well as have defined metrics where appropriate.

Implementation: This step is where the solution is analyzed and tested. Knapp (2016) and Davenport (2014) both support prototyping and testing the solutions to understand the potential impacts. To test the prototypes Knapp (2016) suggests interviewing five select customers from the identifying problem step. The purpose of these interviews is to identify trends and patterns between the interviews.

Testing: The purpose of this step is to bring the solution to market (Thomke, 2003). The important part of this step is specifying the run time and how the data will be analyzed during the experiment (Thomke 2003, Davenport 2014). Thomke (2003) suggests creating a minimum run time to make sure there is enough data to get a clear direction, however, it can be overridden if it becomes apparent the idea will not work.

Recommendation: The final step relates to the final analysis and conclusions to be drawn from the experiment performed. Really it is up to the organizations to figure out how to analyze their data and determine what direction they need to go in (Davenport 2014, Knapp 2016, Thomke 2003).

Another aspect of testing ideas we recognize is the need for training. During the first months of any new initiative, there will be a need to teach the practice to examiners. Bank of America found that during their innovation programs, participating staff members would spend between 30% and 50% of their time training at the beginning of a project (Thomke, 2003).

However long term, the benefits of innovation would outweigh the training costs to any organization.

Large organizations can benefit greatly from fostering the growth of small innovative teams on the inside much like the Test Art Unit. In companies like MasterCard and GE, internal teams self-organize and submit ideas for funding (Alsever, 2015). This strategy was found to give large bureaucratic organizations the ability to be as flexible as startups.

4.4.5: Archiving and Reporting Data

When there are a lot of files and data, it is important that they are able to be stored in a safe area so they can be retrieved later. When archiving, the first step should be to figure out who will be responsible for what data and who has access to it. The Smithsonian suggests that data should be stored on hard drives or solid-state hard drives rather than CDs or DVDs since the technology used to read them has slowly been turned obsolete. should have multiple backups in different locations. Finally, it should be easily recoverable so those who have access will be able to view them (Smithsonian Libraries, 2018).

The Smithsonian Libraries has a Data Management Plan, which is a project protocol documentation. This document summarizes what will happen to the data during and after the project. It will also display who is responsible for the data being analyzed. It will additionally say what can and what cannot happen with the data, so how it will be used (Smithsonian Libraries, 2018).

Salesforce has multiple data archiving strategies that implement. One of them is BigObjects. On this platform, large amounts of data can be stored. There is also a feature that shows the relationship with the customer and their interaction history (Salesforce, 2015).

Section 5: Conclusion and Recommendations

In this chapter, we will start with a summary of our findings and touch upon our recommendations of promising practices. Through discussions with the USPTO, we have found five categories of practices crucial to include in the Test Art Unit. We will delve into each one and explain its importance to the USPTO.

5.1 Summary of Findings

From our research, we have found that successful organizational cultures have these four key factors: a defined goal, shared values, effective collaboration, and good leadership.

- **Defined Goal:** The goal is the driving force behind every decision made at the organization. All decisions are made to further progress towards achieving the organization's goal.
- **Shared Values:** The organization communicates a set of values that have been incorporated into the recruitment process for the organization. This creates a sense of community amongst the employees and a guideline of behavior and mindsets needed to achieve the mission.
- **Sharing Information:** There is a defined structure of communication that consistently presents refined conclusions and results from departments as well as an explanation of how this information connects to the goal.
- **Leadership Support:** Executives are actively involved with their employees. Employees are encouraged to speak up and give feedback to executives.

We have also found that successful experimental cultures have five key factors: establishing experimentation goals, leadership support, communicate an experimentation protocol, sharing information, and risk-taking and failure.

- **Establishing Experimentation Goals:** The goal is high-level and aspirational embodying the mentality of testing ideas and gathering data to further the organization's understanding and provide a future direction.
- **Leadership Support:** Agency leadership champions and rewards innovation. Employees are regularly trained on creative thinking and employees have a clearly defined channel by which innovative ideas can be directed to a panel of agency innovation champions.
- **Established Experimentation Environment:** Leaders embrace a diversity of thought, inclusiveness, and idea-sharing is supported through collaboration, cross-team functionality, and job rotation. Encourages interaction with peers, customers, and internal and external networks of talent as opportunities for collaboration
- **Sharing Information:** Results from experimentations are reported and celebrated organization-wide. The organization is mindful of information shelf-life and can effectively and efficiently use results towards progress.
- **Risk-taking and Failure:** Creativity and innovation are now a foundation of key corporate values. Risk-taking behaviors and practices are driven top-down with the full support and endorsement of leaders. Innovative values and practices have become part of the organization's DNA.

We conclude that having a strong organizational culture will assist in creating a strong experimentation culture. Two key factors of organizational culture overlap with experimentation culture, sharing information and leadership support. Having an already established communication structure will help in creating an experimentation culture because a communication network is already established within the organization. Leadership support is vital for both cultures to succeed because of the need for engaged employees with a direction. Ultimately, the organizational culture will help to lay the groundwork for an experimentation culture.

Based on the results from the organizational culture rubric we found that the USPTO has a strong organizational culture, but with some room for improvements. For example, the results from pilots can more actively be shared amongst the organization and refined to give important conclusions or possible directions from the pilots. The evaluation of the organizational culture revealed some strengths the USPTO has as well. There is a clear mission statement in the 2018-2022 strategic plan that guides the decisions of the USPTO. Also, the USPTO employees feel they have strong leadership that makes an effort to communicate and encourage their employees. There is room for improvement for shared values and sharing information, but leadership support and defined purpose are mature.

After establishing the experimentation key factors we created an experimentation culture rubric. The rubric can be used to evaluate other innovation labs. With this rubric, the USPTO can go to other innovation labs and asked them to evaluate themselves. This is useful to the USPTO so they can compare themselves to other established innovation labs and see their progression. Another use for this rubric is incorporating it into the recruitment process for the Test Art Unit. This use was suggested by the USPTO employee in charge of creating the Test Art Unit. It was further discussed that the rubric will help to inspire interview questions for the recruitment of new employees in the future.

Five innovation practice categories were established from discussion with the USPTO. These five categories are collaboration, employee engagement, and empowerment, intake of new ideas, testing new ideas, archiving and reporting data. While delving into these five categories, we have researched practices for helping to establish a culture of experimentation and possible practices to be used with the Test Art Unit. These practices are detailed in appendices C to F.

- **Collaboration:** When collaboration is encouraged, work performance is increased. This is because effective collaboration helps to identify new angles to approach problems.
- **Employee engagement and empowerment:** When employees feel that their input is valued, they are found to be more productive at work.
- **Intake of new ideas:** Many organizations utilize project management practices and methodologies. These methodologies help employees be able to gather data and deciding what needs to be done.
- **Testing new ideas:** Most organizations that we examined spend a lot of time and money into establishing how to test ideas and providing training for the procedures. We also concluded the methodologies for testing new ideas follow five principles: Identify a problem, generate solutions, implementation, testing, and recommendations.
- **Archiving and reporting data:** When storing data, it is important to note who is responsible for what information, confidentiality of information, and how it will be backed up.

5.2 Practices that Promote Collaboration

The following are a list of promising practices on collaboration that have been successful at other organizations, and we believe that they will potentially be successful at the USPTO as well. Each of these practices and references are detailed in Appendix D

- **SanofiFest:** Sanofi holds retreats to help employees be comfortable with one another and to provide a relaxing environment away from work (Ashfield Meetings & Events, 2019).
- **Coffee Chats:** Ultimate Software onsite employees have thirty minutes of discussions with telecommuting employees about time management and productivity on their side (Russell, 2019).
- **Social-Network-Un-Plugged:** Visa has members write down their names and two positive traits on a sticky note and then stick them on a large piece of paper. The members discuss what skills they have in common and skills that were unique (Cardus & Visa Business, n.d.).
- **Team Charter:** Los Alamos National Laboratory uses this document to classify what everyone's roles, how they will contribute, and what their goals are for a given project (Coleman, Kosbab, Salmo, Trujillo, 2019).

These practices listed above are suggestions that the USPTO can implement. They do not directly apply to this organization, but the USPTO can take inspiration from these practices and try to adapt them. If these practices are adopted, they should potentially help make the teams in the Test Art Unit be able to collaborate well with each other.

5.3 Employee Engagement and Empowerment

The following are a list of promising practices on employee engagement and empowerment that have been successful at other organizations, and we believe that they will potentially be successful at the USPTO as well.

A rubric was created to gauge and help evaluate employee engagement for the USPTO. It will be used to assist in timing the implementation of more ambitious employee empowerment and monitoring initiatives. The chart will also help in gauging how employee engagement at each level relates to more ambitious policy changes in testing and intaking ideas. Each of these practices and references are detailed in appendix E

- **Pulse surveys:** This is a short list of questions that are used to gauge employee feedback. Used at Apple, Amazon, and Microsoft. A complete Implementation and importance report can be found in Appendix E.
 - Baseline Surveys: A longer survey that sets the baseline for the year. Meant to be administered yearly.
 - Deep-dive Surveys: A longer survey focused on one problem or aspect of the organization
- **Kaizen:** The process of constant 1% incremental change. Utilized at companies like Toyota and Lockheed to consistently improve their processes.

These surveys could help monitor the status of the TAU and provide useful data to the USPTO regarding the initiatives being tested. By receiving employee feedback and suggestions frequently, it could help the TAU adapt and make necessary course adjustments. These

adjustments could improve the capabilities of the TAU and lead to it being able to implement more mature ideas.

5.4 Intaking new ideas

The following are a list of promising practices to intake new ideas that have been successful at other organizations, and we believe that they will potentially be successful at the USPTO as well. Each of these practices and references are detailed in appendix E.

- **SCAMPAR:** Many organizations such as McDonald's use this seven step process for ideation (Dam, R., & Siang, T., 2017).
- **Reverse Brainstorming:** Organizations such as health used this technique to determine how to satisfy customers (Mind Tools, 2018).
- See Surveys under Monitoring.

Intaking ideas and monitoring have some overlap with surveys being useful tools in gathering information. The SCAMPAR process could also apply to the creation of USPTO pilots. This is because pulse surveys can both provide feedback and give opportunities to generate new practices and ideas.

5.5 Testing ideas

The following are a list of promising practices to test ideas that have been successful at other organizations, and we believe that they will potentially be successful at the USPTO as well. Each of these practices and references are detailed in Appendix C.

- **MasterCard and GE:** These companies use teams to self-organize and submit ideas for funding. A panel of executives judge and award funding to internal-startups that function similar to innovation labs. It's an example of giving small internal teams the initiative to operate outside of company policies.
- **Design Sprint:** Slack and Flatiron Health use the testing ideas section to allocate time to test the ideas. A design sprint is a five-day process that starts with problem identification and ends with prototype testing. It is used for rapidly testing ideas to learn their impacts.

These practices do not directly apply to the USPTO, however, the USPTO can take inspiration from them. Each of these practices includes methods for thinking and solving problems that the USPTO can adapt to the Test Art Unit with the goal of the USPTO establishing its own experimentation procedure.

5.6 Archiving and reporting data

The following are a list of promising practices on archiving and reporting data that have been successful at other organizations, and we believe that they will potentially be successful at the USPTO as well. Each of these practices and references are detailed in Appendix F

- **Memoranda of Understanding:** Smithsonian Libraries have developed responsibilities toward data archiving in collaborative projects (Smithsonian Libraries, 2018).
- **BigObject:** Salesforce helps archive data by creating a program that can take large amounts of data (Salesforce, 2015).

These practices that we have found should potentially aid the USPTO to take inspiration from or to alter the current process they have. This should help Test Art Unit organize their data.

5.7 Limitations of Data

The purpose of this project was to inform the USPTO on proven innovative practices and the culture that is associated with them. As discussed in section 4.2 information has a shelf-life. This includes the data presented in this project. The field of innovation is constantly changing and adapting as is the essence of innovation. New innovative ideas will constantly be coming out improving on the older ones. However, this does not mean the research here will be completely obsolete in the future. The practices and information here will help the USPTO establish their own innovation lab. Another limitation is the practices do not directly apply to the Test Art Unit the USPTO wants to create. The USPTO will need to create their own processes for innovation. The purpose of this research was not to give the USPTO a framework to utilize in the Test Art Unit, but rather to inform on what other organizations have for innovation that has been successful.

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Characterizing USPTO Culture Interview

Hello and thank you for participating in this interview. The reason we are here is to assist in researching successful innovation practices for a Test Art Unit that is in development here at the USPTO. We want to create a resource that will describe some of the most successful practices from other organizations and businesses that will inform the USPTO on what an innovation lab looks like with respect to culture and suggestions on procedures that can be used in the lab. The purpose of today's interview is to learn what the culture is like at the USPTO and how it can be characterized. This will help us understand the culture here better and how it might respond to an innovative setting. This way we can sort through the practices we researched and determine which might work better than others for the USPTO. Comments will remain anonymous.

Collaboration

We understand that right now there is little collaboration between examiners at the USPTO. Once an examiner reaches GS-14 they are essentially a mini-patent office. The commissioner has granted them the authority to approve or deny patents. We want to know if examiners were put into a collaborative environment what would that look like, are there barriers to examiners collaborating, etc.

1. How do you think examiners will react to being put into a collaborative environment?
2. What would be some benefits to collaboration? How do you see these benefits happening?
3. What would be some barriers to collaboration? How might these barriers be overcome?
4. How would telecommunication affect collaboration? Will there be any examiners telecommuting into the Test Art Unit or do you think the Test Art Unit requires a physical presence?

Motivation/Engagement

Part of a collaborative environment is having motivated and engaged employees willing to try and improve the company. We want to know if there are methods that already exist within the USPTO that keep employees motivated and engaged.

1. Since part of the goal of the Test Art Unit is feedback on the ideas being tested. More specifically this means identifying what the examiners feel could be improved. What will motivate examiners to give reliable feedback? Are there any ideas already in discussion on how to accomplish this?
2. Are there any current channels of employee empowerment? What are they and do they seem to work?

3. In an earlier talk, Marty had mentioned that some of the examiners see the USPTO as a stepping-stone to future careers. How would this mentality affect feedback? How would this mentality limit the motivation and engagement of employees?

Effective Communication:

We would like to gauge how well goals and expectation for employees at the USPTO are communicated. We understand that the USPTO has mission clearly stated in its strategic plan for 2018-2022. However, this does not mean it is well communicated and a shared mission amongst the employees.

1. How well would you say the mission of the USPTO is communicated amongst the employees?
2. How well are the expectations and standards of the USPTO communicated amongst the employees? What are some expectations and standards? Standards and values meaning does the USPTO express a desired behavior or mindset from their employees?
3. We understand that the USPTO is a hierarchical organization. How are goals and expectations of employees different at each hierarchical level? Are these different goals aligned with the overall mission statement?
4. How well are the results from pilot initiatives communicated?
5. Are there any platforms for employee ideas, such as a forum to fill out when employees have an idea to improve the USPTO?

Appendix B:

Collaboration Matrix			
Key Factor	Maturity Level 1	Maturity level 2	Maturity Level 3
Goal Setting and role clarification	There is some talk about team members setting goals while briefly talking about what roles they each will have.	There is a discussion about the goals that the teams need to set for themselves and for their teams. Because they have a clear idea of goals, they each know what tasks to take.	There is an active discussion about what the goals are for everyone. They are not only internalized, but also written down alongside the tasks they will take on.
Interpersonal – relationships	There is some mingling, but most are still uncomfortable with each other. Very few people are comfortable sharing ideas.	Comfortableness has increased among the members and are able to make small talk. More members are able to speak up and share their thoughts.	Members are very comfortable with each other. They are able to effectively communicate their ideas with very little to no fear of judgement. This makes discourse among members informative and smooth
Debriefing	There is talk about setting time aside to talk about the contents of the meetings	There is talk and a specific time has been set for debriefing.	Specific times have been set and consist of active discussions on what they are doing well and what they should improve upon.

Intake of Ideas Rubric

Key Factors	Maturity Level 1	Maturity Level 2	Maturity Level 3
Generation	Executives and supervisors generate most of the ideas being implemented. Examiner feedback isn't implemented and participation in surveys is low due to survey fatigue.	Examiners are given effective surveys and their feedback is addressed by superiors. Issues discovered in the process are often fixed quickly.	Examiners feedback make up the bulk of ideas being generated. Surveys are effective and conducted after previous feedback is implemented.
Evaluation	There is an overflow of ideas and no system to properly sort through them. Some good ideas reach the implementation phase but many aren't see quickly, leaving some problems unaddressed for extended periods of time.	A system of peer review or technological filters is implemented to allow for the most promising ideas to reach the Implementation phase relatively quickly.	A mix of peer review and technological filters result in quality ideas reaching those who can implement them fastest. Little to no bottleneck of feedback allowing for quick changes.

Implementati
on

Ideas are implemented and go through a complete testing cycle of the Test Art Unit without being adjusted or taking feedback into account.

Ideas that are implemented come from Feedback, and new initiatives can be adjusted during the testing cycle when problems arise.

Problems are addressed rapidly after they are identified during the testing cycle and feedback is implemented at pace matching the frequency of surveys.

Archiving and Reporting Data Rubric

Key Components	Maturity Level 1	Maturity Level 2	Maturity Level 3
Accessibility	The recorded data is accessible to very few people	Accessibility has increased among employees	All data is accessible to who it should be. Everyone is able to access them without difficulty.
Back up copies	There is only one copy of all of the data.	There is a back up available in one other location.	There are multiple back ups in different locations, and these include long term storage.
Back up plan	There is no back up plan put into existence.	There are talks of a back up plan to recover data to be instated. They have begun to come up with a plan.	A data recovery plan has been created and established. The procedures are defined so it is feasible to know what to do if something unforeseeable happens to the data.

Procedures for Testing New Ideas

Design Sprint: A design sprint is a book on a five-day process that starts with problem definition and ends with prototype testing. Each day corresponds to a different goal. Each of the five-days are explained separately below.

Importance: Before even beginning a design sprint one needs to familiarize themselves with the process. The set-up is everything that needs to be done so a design sprint can be conducted. It ranges from scheduling things for certain days to the type of snacks that could be included in the room. The important part of this set up period is choosing a Facilitator and Decider. These two people should be familiar with the process of a design sprint because they will be running it.

Implementation: Not all these steps are necessary, really it is up to those running the sprint to determine what materials are needed. Below are some suggestions from the creators of the design sprint.

- Set the stage for a design sprint
 - Five things needs to happen
 - Choose a big challenge
 - Recruit a sprint team
 - Block five full days on the calendar
 - Block a room with two whiteboards
 - Get sprint supplies (paper, markers, coffee, snacks, etc.)
- Get a Decider (or two)
 - Without a Decider, decisions won't stick. If your decider can't join the entire sprint, have the decider appoint someone who can for when they are absent. However, this Decider should be able to come in once in a while to help especially on days like Wednesday. This is because Wednesday is the day to pick a solution for the problem. This is a big decision that should be done by the Decider. This is further discussed in the explanation of Wednesday.
- Recruit a sprint team
 - Seven people or fewer (4-7). It can be more than 7, but the optimal number is 7. Get diverse skills along with the people who work on the project day-to-day. If the people cannot make it physically to the design sprint there is an article on how to conduct a sprint over the phone as reference D.
- Schedule extra experts
 - Not every expert can be in the sprint all week. For Monday afternoon, schedule fifteen – twenty minute interviews with extra experts. Plan for two to three hours.
- Pick a Facilitator
 - Will manage time, conversations, and the overall sprint process. Look for someone who's confident leading a meeting and synthesizing discussions on the fly. Understands the Sprint process.
- Block five full days on the calendar
 - Have to reserve time for the sprint team. Make them full and consecutive days.
- Customer Interviews

- Something to keep in mind is at the end of this Sprint the group will be conducting interviews. These interviews will be a one-on-one with the customer and one of the group members, while all the other members are in another room observing. These interviews need to be scheduled at some point, which should take place after Monday. On Monday the group will identify a target and a target customer, after Monday interviews should be scheduled with five customers. There are resources on the sprint website on how to screen customers.
- Key Ideas
 - No Distractions
 - Such as laptops, phone, or iPads. If needed leave the room or wait for a break
 - Timebox
 - Sprint keeps a tight schedule so keeping a timer or something will create focus and urgency.
 - Plan for a late lunch
 - Snack at like 11:30, but lunch at 1.
- Sprint Supplies
 - Lots of whiteboards
 - Yellow 3-by-5 sticky notes
 - Black whiteboard markers
 - Green and red whiteboard markers. (ten of each for Friday's observation)
 - Black felt-tip pens (Tuesday sketching)
 - Printer Paper (sketching)
 - Masking tape
 - Small dot stickers (1/4 inch) (For heat map votes must be all the same color) (200)
 - Large dot stickers (3/4 inch) (For How Might We votes, straw poll, and supervotes all the same color different from the smaller ones) (100)
 - Time Timers (two, one to keep on track, and one to say when to take a break)
 - Healthy Snacks(Fruits, yogurts, nuts)
 - Energy boost Snacks (Chocolate, coffee, tea)

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Design Sprint: Monday

Importance: Monday is for problem identification and mapping your service. It follows three basic principles: knowledge sharing, understanding the problem, and choosing a target. The goal of Monday is allow everyone to share what they know to come up with a clear picture of the problem and set a long term goal. This is done to prioritize where the sprint will focus so time is not wasted on the wrong parts of the problem.

Implementation:

- 10 AM: First is introductions go around the room and introduce yourselves pointing out the Facilitator and Decider. Next, describe how a Design Sprint works, there is PowerPoint slide presentation at thesprintbook.com that explains the sprint as well as the rules with it.
- 10:15: Set a long-term goal
 - What is the point of this project? If it goes perfect what will it look like in 6 to 12 months or even further? Write this on a whiteboard.
- List questions
 - After setting goal next is time to ask how can the project fail? List out all the questions, assumptions, risks, etc. that might prevent success of the project.
- 11:30: Make a map
 - Making the map can be hard, but list customers and key players on the left. Draw the ending with completed goal on the right and make a flowchart between the two, showing how customer interact with your service. Below is a method call Note-n-Map developed by a design sprint specialist.
- Note-N-Map: This method is a more defined way of mapping your service that might help during the sprint run smoother.
 - Before starting agree on 3 important elements of the mapping process
 - Who is the target client/user?
 - Beginning of the story: where does customer experience begin?
 - End of the story: what is the goal the customer is trying to reach?
 - Map alone
 - Individually for about 10 minutes. Everyone gets some horizontal sticky notes and created a simple journey mapping the user experience. One action per note. Limit this to a 5-15 step process.
 - Everyone then will stick their timelines on the wall (5 minutes)
 - Once everyone's timeline is up each person will explain their journey, 2 minutes per person. Do not make a sales pitch, but rather explain the process.
 - After the presentation is done have everyone take their dot stickers and vote on which parts of the processes they liked/are necessary. Can take a minute to discuss the story or answer questions.
 - Then throw away all the notes without a sticker on them to identify the highlighted steps for the process.
 - Finally merge the stories together making one complete map. (10 minutes max)
- Take a lunch break around 1pm.
- 2 PM: Ask the experts
 - During this time interviews will be conducted with marketing experts. This is a time for knowledge sharing to improve the map. The experts should be used to enhance understanding of the problem
 - During the interviews the other team members should be taking How Might We notes. These notes are any questions or ideas that come up during the interview

- that the person thought was interesting. One idea per note and just make a stack as you go. HMW is used to identify problems and then think about how they can be turned into opportunities.
- 4 PM: After this stick all the notes on the whiteboard and organize them by moving similar ideas next to each other. Start labelling themes as they emerge. This does not need to be perfect. Take about 10 minutes to do this.
 - Then the team will vote on the HMWs, each person gets two votes. They can vote for themselves and they can vote for the same idea twice. Move the winners onto the map. Each HMWs should correspond to a moment in the process.
 - Finally, at the end of this the Decider will circle one important customer and one important moment on the map. The team can weigh in, but the decider makes the call.
 - Key ideas
 - Start at the end
 - Start by imagining the end result and risk along the way. Then work backwards to figure out the steps needed to get to the goal.
 - Nobody knows everything
 - The purpose of this day is for knowledge sharing, but no one should have the misconception the decider or anyone else in the room knows everything needed. If they did why do the sprint.
 - Facilitator Tips
 - Ask for permission
 - Ask the group for permission to facilitate. Explain that you will be trying to keep things moving to create an effective sprint.
 - ABC: Always be capturing
 - Synthesize the team's discussion into notes on the whiteboard. Improvise when needed. Keep asking, "How should I capture that?"
 - Ask obvious questions
 - Pretend to be naïve and ask, "why"
 - Take care of the team
 - Keep the team energized. Take break every 60-90 minute as in snack breaks.
 - Decide and move on
 - Slow decisions sap energy. If the group slips into a long debate, ask the decider to make a call.

References:

- E) Knapp, J., Zeratsky, J., & Kowitz, B. (n.d.). How it Works. Retrieved from <https://www.thesprintbook.com/how>.
- F) Knapp, J., Zeratsky, J., & Kowitz, B. (2016). *Sprint: how to solve big problems and test new ideas in just five days*. London: Bantam Press.
- G) Zeratsky, J. (2017, June 15). Sprint: Monday. Retrieved from <https://library.gv.com/sprint-week-monday-4bf0606b5c81>.

Design Sprint: Tuesday

Importance: Tuesday is called sketch day, because everyone will be sketching their own individual ideas for a solution to the problem identified on Monday. This process uses inspiration from solutions by other companies or your company. The key to this process is it avoids the energy-draining and long-winded brainstorming and debates. Unstructured brainstorming has been shown to be an ineffective way to

analyze a problem. Three sources supporting this are in the references below. By allowing individuals to analyze the problem by themselves different angles can be seen and more creative solutions are made.

Implementation: The first part of Tuesday is dedicated to an exercise called lightning demos. The purpose of these demos is to get inspiration from competitors and identify what worked well or what people liked from those solutions. Everyone present in the design sprint should research another product or solution from another company and be prepared to present it on Tuesday. Then the rest of the day is spent sketching solutions in a four-step process outlined below.

- 10 AM: Lightning Demos
 - Everyone does research on some great solutions from other companies and maybe within its own company. Give three minutes to each demo and capture the good ideas from the solution in a drawing on the whiteboard. Delegate someone to take notes on the whiteboard.
- 1 PM: Lunch
- 2 PM: The Four-step sketch. This sketch is done individually and quietly.
 - The first step is to take notes on the problem. Any inspiration you had from the demos or anything you've thought of for that could be part of the solution. Devote 20 minutes to this.
 - Spend another 20 minutes drawing out rough ideas. Circle the promising ones.
 - Crazy 8s, fold a sheet of paper to create eight frames. Sketch a variation of one of your best ideas in each frame. Spend 1 minute on each frame.
 - For 30 to 90 minutes create a three-panel storyboard by sketching in three sticky notes on a sheet of paper. Make it as clear as possible and keep it anonymous. Artistic ability doesn't really matter, but words do. Give it a catchy title.
- Once done just leave the sketches in a pile facedown.
- Key Ideas
 - Anyone can sketch, most solutions are just rectangles and some words. They do not need to be works of art just informative
 - Concrete beats abstract, use these sketches to turn abstract ideas into concrete solutions that can be assessed.
 - Work alone together, group brainstorms don't work. Instead, give each person time to develop solutions on his or her own.

References:

- H) Knapp, J., Zeratsky, J., & Kowitz, B. (n.d.). How it Works. Retrieved from <https://www.thesprintbook.com/how>.
- I) Knapp, J., Zeratsky, J., & Kowitz, B. (2016). *Sprint: how to solve big problems and test new ideas in just five days*. London: Bantam Press.
- J) Zeratsky, J. (2017, June 15). Sprint: Tuesday. Retrieved November 18, 2019, from <https://library.gv.com/sprint-week-tuesday-d22b30f905c3>.
- K) Chamorro-Premuzic, T. (2015, March 25). Why Group Brainstorming Is a Waste of Time. Retrieved from <https://hbr.org/2015/03/why-group-brainstorming-is-a-waste-of-time>.
- L) Goldenberg, O., & Wiley, J. (2019). Individual and Group Brainstorming: Does the Question Matter? *Creativity Research Journal*, 31(3), 261–271. doi: 10.1080/10400419.2019.1619399
- M) Knapp, J. (2017, August 4). Stop Brainstorming and Start Sprinting. Retrieved November 18, 2019, from <https://medium.com/@jakek/stop-brainstorming-and-start-sprinting-16180839b43d>.

Design Sprint: Wednesday

Importance: Wednesday is a day to come together and commit to one or two of the solutions so on Thursday a prototype can be built. To determine which ideas the group wants to prototype a structured decision-making process will be used. This is to avoid debates because debates are slow, time consuming, and energy consuming. This process also takes into account feedback from everyone in the group allowing for a completely informed final decision on which prototype to pursue.

Implementation: Wednesday starts off with creating a try of art museum of solutions. Everyone will be hanging their solutions up on the whiteboard. Examiners will review the sketches individually and quietly and place little dot stickers on parts of the solution they liked creating a type of heat map of what the group thinks will work. Next, everyone gets together and discusses the highlights of each solution and then the creator can explain anything the group missed. Finally, after all the information is shared and everyone has shared their opinion everyone takes one large dot and places it on the solution they like best. The final decision comes down to the Decider on which solution will be prototyped. After this the rest of the day is creating a storyboard for the solution and making as many decisions about the solution as possible before Thursday.

- 10 AM: Sticky decision
 - Art museum: Tape the solutions sketches to the wall in one long row.
 - Heat Map: Have each person review the sketches silently putting one to three of the dot stickers besides every part they liked.
 - Speed Critique: Three minutes per sketch. As a group, discuss the highlights of each solution. Capture standout ideas and important objections. At the end have the creator come forward and explain anything that was missed. This is not a sales pitch, just an informative telling.
 - Straw poll: Each person silently chooses a favorite idea. All at once, each person place one large sticker to register his or her vote.
 - Supervote: Give the decider three large dots and write their initials on each. The decider will ultimately decide which idea or ideas to pursue. The decider can pick up to three, but no more. Their vote in final and the one the group will pursue.
- 11:30-ish
 - Divide winners from “maybe-laters”: Move sketches with supervotes together
 - Rumble or all-in-one: Decide if the winners can fit into one prototype or if conflicting ideas require two or three competing prototypes. If more than one idea is going to be prototyped the group will be doing a rumble.
 - Note-and-Vote: Ask people to individually write ideas down then list them on a whiteboard, vote, let decider make final decision. Use Note-and-Vote to decide on fake brand names for the prototypes.
- 1 PM: lunch
- 2 PM: Make a storyboard. The purpose of this storyboard is to sketch out the entire journey through your product/service with enough detail so that everybody knows what goes into the prototype for Thursday. This means including the solutions in the storyboard. Try to make as many decisions about prototyping as possible today so Thursday can be quick and efficient. By making decisions about the prototype on Wednesday everyone should know what is going in the prototype on Thursday. How this storyboard comes together is up to the group and being creative.
 - Draw a grid: About 15 tiles on the whiteboard
 - Choose an opening scene: Think of how customers normally encounter your service or product. Keep the opening simple like a web search, magazine article, store shelf, etc.

- Fill out storyboard: Move existing sketches to the storyboard when you can and draw when you can't. Do not write, include enough detail to let the team prototype on Thursday. When in doubt take risks to finish the story, final storyboard should be about 5 to 15 tiles long.
- Storyboard 2.0 is method of storyboarding devised by a product design specialist in Berlin. Below are some possible improvements to make the storyboarding process a little bit faster (Höfer, 2018).
 - Instead of just starting sketching everyone should agree on a rough sequence of actions.
 - Everyone gets eight sticky notes. For 2-3 minutes everyone writes one key action on each sticky note going from first product discovery to the end keeping the sprint questions (Monday) in mind. After this stick each timeline on a board in straight line each making a matrix. The Facilitator will then go through each of the timelines and when something is repeated, they take it off and start to form a master timeline. This shows where the team is aligned and where there needs to be discussion. If the team gets stuck during discussion have the Decider make the call. Once a timeline is agreed on stick the notes to the board and start making the storyboard.
- Facilitator Tips
 - Decision making is going to take energy. When tough decisions present themselves defer to the Decider. Don't let new abstract ideas sneak in either, work with what you have up to this point. Avoid trying to add new twists to the solution, instead work with the established information and the decided-on solution.

References:

- N) Knapp, J., Zeratsky, J., & Kowitz, B. (n.d.). How it Works. Retrieved from <https://www.thesprintbook.com/how>.
- O) Knapp, J., Zeratsky, J., & Kowitz, B. (2016). *Sprint: how to solve big problems and test new ideas in just five days*. London: Bantam Press.
- P) Zeratsky, J. (2017, June 15). Sprint: Wednesday. Retrieved November 18, 2019, from <https://library.gv.com/sprint-week-wednesday-900fe3f2c26e>.
- Q) Höfer, T. (2018, October 23). Storyboarding, 2.0! Retrieved November 18, 2019, from <https://sprintstories.com/storyboarding-2-0-4e282b2da94d>.

Design Sprint: Thursday

Importance: Thursday is the day for prototyping the solution outlined on Wednesday. The prototype will be a realistic façade and by no means a perfectly finished product. The goal is to have something testable that customers can react to at the end of Thursday. The design sprint authors identify this prototype as “Goldilocks quality” or a product just real enough where customers can have real and honest reactions to it.

Implementation: A key concept to keep in mind during Thursday is the product does not have to be perfect. Instead aim for the “Goldilocks quality” mentioned above. Rely on the decisions made on Wednesday when designing the prototype will make the process much smoother. The storyboard from Wednesday should be able guide the group on how to build the prototype. Finally, divide and conquer by assigning roles to everyone in the group so everyone is working on some aspect of the prototype. If a tough decision comes up defer to the Decider in the room.

- 10 AM: Picking the right tools
 - To create this prototype the group is going to need tools to create it. Tools can be almost anything ranging from PowerPoint to a wrench. The group should pick tools that are optimized for speed not quality.
- Divide and conquer
 - Assign the roles of maker, stitcher, writer, asset collector, and interviewer. If there are enough people there can be multiple of each role, the Facilitator and Decider should also assume one of the above roles.
 - Maker: Responsible for creating the individual components of the prototype
 - Stitcher: Responsible for combining the components produced by the makers. Try to make the combination seamless so the components can flow into each other.
 - Writer: Responsible for writing text for the user that is easy to understand.
 - Asset Collector: Responsible for surfing the web finding whatever images are needed for the prototype.
 - Interviewer: Responsible for writing an interview script for Friday.
- Being prototyping once tools have been picked and roles assigned
- 1 PM: Lunch
- 2 PM: Being prototyping once more
 - Being stitching the prototype together checking quality and making sure the components work together (stitcher's job). The quality does not need to be perfect, but operational.
- Once the prototype is complete do a trail run thorough to make sure it works and fix anything that needs to be fixed. Do not fret over small things, but rather fix big glaring mistakes.
- Throughout the day
 - Write an interview script, the Interviewer should be writing a script for customer interviews on Friday.
 - Remind selected customers to show up on Friday
 - Buy something to thank the customers for coming in to test the product.
- Key Ideas
 - Prototype Mindset: Anything can be prototyped. These prototypes should be disposable and built so something can be learned from them. Make the prototype appear real
 - Goldilocks Quality: Just enough quality to evoke honest reactions from customers.

References:

- R) Knapp, J., Zeratsky, J., & Kowitz, B. (n.d.). How it Works. Retrieved from <https://www.thesprintbook.com/how>.
- S) Knapp, J., Zeratsky, J., & Kowitz, B. (2016). *Sprint: how to solve big problems and test new ideas in just five days*. London: Bantam Press.

- T) Zeratsky, J. (2017, June 15). Sprint: Thursday. Retrieved from <https://library.gv.com/sprint-week-thursday-df8d7c8c0555>.
- U) Lo, G. (2018, November 11). What's a Design Sprint and why is it important? Retrieved November 18, 2019, from <https://uxplanet.org/whats-a-design-sprint-and-why-is-it-important-f7b826651e09>.

Design Sprint: Friday

Importance: Friday is the interview day with selected customers. These customers are the ones identified on day one where the Decider circled a target and customer group to focus on. Naturally, it makes sense to interview the targeted user once a prototype has been developed. The point of today is to identify and document the reactions of customers to the prototype built on Thursday. This way the group can know if the idea is worth pursuing or if they should scrape it. The number of interviews will be five because five is enough to identify major trends. After Friday the team should have the necessary information to gauge customer reactions to the implementation to the solution you created. It is important to keep in mind that regardless of the results the sprint will provide valuable information on where to go next. If the customers liked the prototype maybe it should be explored more and improved. If the customers dislike the prototype then examiner another angle. It is up to the sprint team to come together after the interviews and analyze the results to reach a conclusion.

Implementation: The set-up for Friday is really all in the preparation for the interviews. Make sure to have a strong interview protocol. An overview of what the interview should be like it provided below, but it can be set up however the team thinks is effective. The team should pay close attention the specific reactions the customer has to certain components of the prototype as well as marking down direct quotes. After all the interviews are done the team should get together and go over the notes and identify any trends that emerge. Specifics of how to set up the rooms and how to conduct an interview are on the sprint website provided in the reference.

- **Makeshift Research Lab**
 - Two Rooms: There will be the sprint room and another room where the interviews will be conducted.
 - Set up hardware: Position webcam so you can see customers' reactions.
 - Set up video stream: Use any video-conferencing software make sure the sound quality is good.
- **Key Ideas**
 - Five is the magic number: After the five interviews, the most prevalent trends can be identified.
 - Watch together: the entire sprint team should be taking notes together and recording trends.
 - A winner every time: The prototypes will either have a flawed success or be an efficient failure
- **Five-Act Interview**
 - Friendly Welcome: Welcome the customer and make them feel at ease. Explain that you're looking for feedback
 - Context questions: Start with easy small talk then transition to questions about the topic you're trying to learn
 - Introduce the prototype: Remind the customer that somethings might not work and that you're not testing him or her. Ask the customer to think aloud when testing.

- Task and nudges: Watch the customer figure out the prototype on their own. Start with a simple nudge and ask follow-up questions to help the customer think aloud.
- Debrief: Ask question that prompt the customer to summarize then thank them and give them a gift card or something.
- Before the first interview
 - Draw a grid on the whiteboard creating columns for each customer and a row for each prototype
- During Interviews
 - Take notes as you watch. Hand out sticky notes and markers write down direct quotes, observations, and interpretations. Indicate positive or negative.
- After Interviews
 - Stick up notes. Stick the notes in the correct row and column on the grid. The discuss the interviews, but wait to draw conclusions
 - Take a break
- At the end of the day
 - Look for patterns. At the end of the day read the board in silence and write down patterns. Make a list of all the patterns people noticed. Label them positive, negative, or neutral.
 - Wrap up the sprint. Review the long-term goal and your sprint questions. Compare with the patterns you saw in the interviews. Decide how to proceed from here and write it down.

References:

- V) Knapp, J., Zeratsky, J., & Kowitz, B. (n.d.). How it Works. Retrieved from <https://www.thesprintbook.com/how>.
- W) Knapp, J., Zeratsky, J., & Kowitz, B. (2016). *Sprint: how to solve big problems and test new ideas in just five days*. London: Bantam Press.
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Improving Collaboration and Team Dynamics

SanofiFest:

Sanofi has an annual retreat called SanofiFest. It is a carnival-like retreat where they have 700 delegates do various exercises.

Importance:

Retreats can be important in developing relationships between team members. This is because of two reasons. One is that employees get out of their usual work environment, so they are not in the stressful environment. Another reason why is because employees can mingle with each other. By having employees intermingle with each other, it develops good working relationships.

Implementation:

Sanofi sets up a fair like event. They have all sorts of activities that delegates can participate in.

- Activity 1: This activity that required a person to walk barefoot across hot coals. This activity was supposed to showcase courage.
- Activity 2: This activity consisted of knife throwing, tightrope walking, and creating human pyramids. This activity helped improve teamwork among the people there.
- Activity 3: This activity had people scan the campground and put in place tents and bedding inside it. Anyone who wanted to stay the night could attempt to stay in there. This activity also helped everyone improve teamwork.
- Activity 4: In this activity, the people were asked to bring bags. With these bags, they created 350 care packages for the homeless.

Reference:

Ashfield Meetings & Event. (2019). SanofiFEST: A company day with a twist: Ashfield Meetings & Event. Retrieved November 6, 2019, from <https://www.ashfieldmeetings.com/uk/case-studies/a-company-day-with-a-festival-twist/>.

CoffeeChats:

At Ultimate Software, an employee who works from home gets paired up with someone who comes to the office daily and conversations on work and home life

Importance:

Organizations that help their employees connect with each other to make strong connections result in having strong teams with effective collaboration. At the 2019 Fortune 100 Best Companies to Work For, 86% of employees who work at these organizations said they can count on cooperation from people and 91% of employees said that they care about each other.

Implementation:

These employees get paired up by the company. They consist of an office-based and a virtual employee. They engage in a thirty minute chat that occurs biweekly about productivity, time management, and how it can be improved. Work is not only topic they talk about, they also discuss what's going on their lives. This can be helpful for the USPTO because employees can have one on one conversations with on another and figure out how improvements can be made as a team. On several occasions the contents of these meetings are presented during their group meetings.

Reference:

Russell, T. W. (2019, May 2). How to Create a Culture of Collaboration in the Workplace. Retrieved November 13, 2019, from <https://www.greatplacetowork.com/resources/blog/how-to-create-a-culture-of-collaboration-in-the-workplace>.

Social-Network-Un-Plugged:

Visa has an activity called Social-Network-Un-Plugged in which they write down two traits of them on a sticky note and then place it on a bigger piece of paper.

Importance:

This activity is important because it fosters a sense of community within the group. Members will be able to talk about others and themselves in front of the group. This is crucial for the long run when eventually they will have to work together as a team on a project and share ideas.

Implementation:

Visa has its employees each take a Post-it and has them write their name, a drawing of their face, and two traits that they have. They then place these sticky notes arbitrarily on a big piece of paper. Each person takes a marker and draws lines that connect themselves to another person, like a similar trait or preference. Then each person counts how many connections come from their name. After the number is known, there is a discussion that takes place. This discussion consists of a reflection of how the connections were formed, how they were broken, how they were strengthened, and how they were changed.

Some discussion questions that can be asked:

- How many connections were formed?
- What surprised you about the connections?
- In what ways did you form connections?
- Who are you connected with that you did not know you shared such a connection with?

Reference:

Cardus, M., & Visa Business. (n.d.). Team Building Exercises. Retrieved November 1, 2019, from https://usa.visa.com/dam/VCOM/download/business/VSB_MichaelCardus_TeamBuildingExercises.pdf

Creation of a Team Charter:

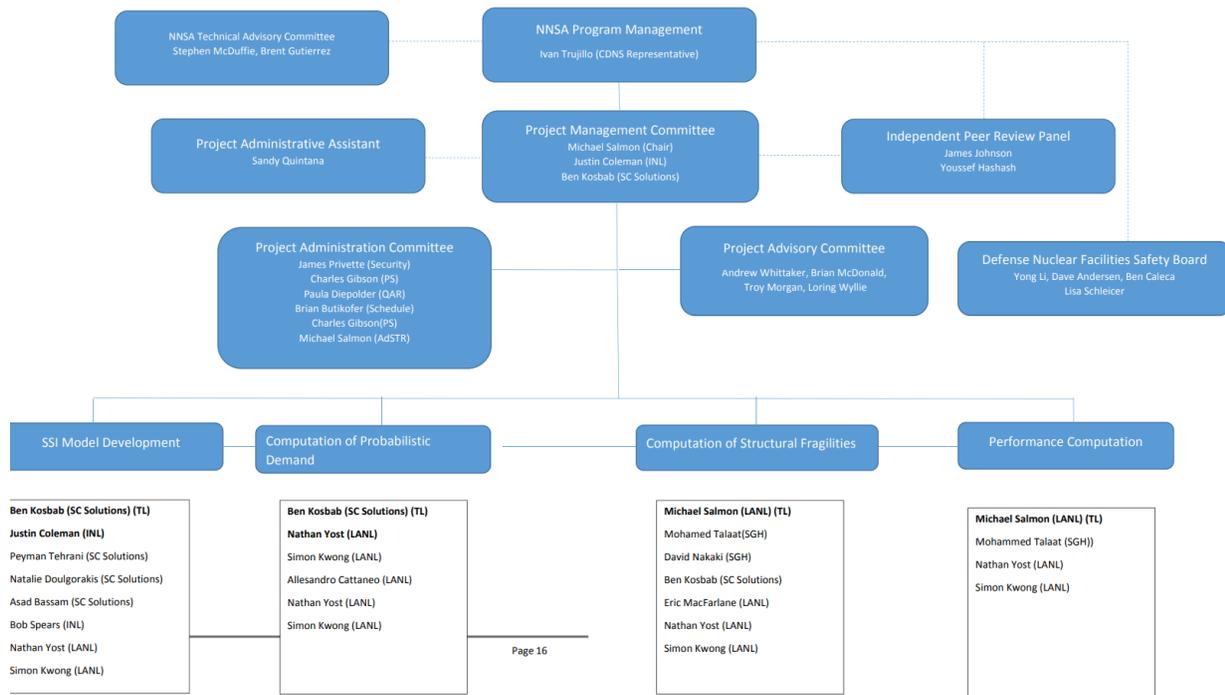
The Los Alamos National Laboratory has their teams create team charters at the beginning of their project.

Importance:

It is important to create a team charter because it will make team operations run smoothly. In team charters, every member in a team identifies goals they have to achieve internally and goals they plan to achieve together as a team. Once that is determined, everyone is given a role they are in charge of. They do not necessarily need to be all different roles, but it is important for each member to know what their tasks will entail. Once all of this information is determined, they are documented to become a team charter.

Implementation:

The Los Alamos National Laboratory has several teams that do studies. One team in particular created a team charter to identify everyone's roles and goals. They made a diagram that effectively illustrates everyone in the team's roles.



Reference:

Coleman, J., Kosbab, B. D., Salmon, M. W., & Trujillo, I. E. (2019, January 29). PF-4 SEISMIC

PERFORMANCE REASSESSMENT LOS ALAMOS NATIONAL LABORATORY PROJECT
CHARTER AND INTEGRATED PROJECT TEAM. Retrieved December 1, 2019, from
<https://permalink.lanl.gov/object/tr?what=info:lanl-repo/lareport/LA-UR-19-20688>.

Methods of Measuring and Increasing Employee Engagement

Pulse Surveys: A short set of targeted questions designed to be administered frequently to gather employee feedback and gauge their satisfaction, engagement, or both.

Importance: Surveys administered weekly help take the companies "pulse," giving almost real-time feedback on employee engagement, and the status of the Test Art Unit. These surveys will empower and encourage engagement in employees by demonstrating that their voice matters. Engaged employees are less likely to take time off and are more productive overall. By bringing a heightened level of passion and interest to the job, engaged employees often lead to innovation. Engaged employees would be contributing more valuable feedback on the successes and shortcomings of initiatives and policies.

Implementation: Each survey should consist of five to no more than about twenty questions. They shouldn't take more than ten minutes to complete. At the start of each testing period in the Art Unit, or at the beginning of each year a larger engagement survey should be conducted. This survey would consist of additional questions and help to serve as a baseline.

There's no motivation for an employee to take a pulse survey if they feel their feedback isn't valued. To avoid this survey fatigue Pulse Surveys should only be done as quickly as their suggestions and changes can be implemented. The following are some example questions:

The first five questions gauge engagement, the next on L.E.A.D (leadership, Enablement, Alignment, Development) and finally "Free text," essentially open response questions. Some questions the USPTO should implement include:

- "The leaders at [company] keep people informed about what is happening"
- "I have access to the things I need to do my job well"
- "I receive appropriate recognition when I do good work"
- "Day-to-day decisions here demonstrate that quality and improvement are top priorities"
- Then finally, the "Free Response" questions:
 - "Are there some things we are doing great here?"
 - "Are there some things we are not doing so great here?"
 - "Is there something else you think we should have asked you in this survey?"
- "So, why measure this?"
 - "Many organizations want to improve employee engagement because it has positive flow-on effects on things like performance, retention and innovation."

References:

- A) "Employee Pulse Survey Best Practices." Culture Amp Blog, September 13, 2019.
<https://www.cultureamp.com/blog/best-practices-for-using-employee-engagement-pulse-surveys/>.

Archiving and Reporting Data

Data Management Plan:

This is a document that gives an outline on what will happen with the data during a research project.

Importance:

The importance of this document is to establish a set procedure on how to organize data. It documents how the information will be recorded, who will have access to it, and if additional copies will be made.

Implementation:

While making this document, it is important to have the following criteria:

- Who is responsible for a set of data
- Who has access to and how much of it has a restriction for viewing
- Long term storage media
- Copies on multiple media platforms
- Estimation of storage costs, if needed

References:

Smithsonian Libraries. (2018). Smithsonian Data Management Best Practices. Retrieved December 3, 2019, from <https://library.si.edu/sites/default/files/tutorial/pdf/storagearchivingpreservation20180307.pdf>.