Talent Acquisition in Scientific and Engineering Disciplines: A Case Study of National Laboratory

(TASED)

by

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![Los Alamos National Laboratory logo]

ABSTRACT

Identifying the hindrances to performing effective talent acquisition within the science, technology, engineering, and mathematics field is an important topic for technical hiring managers. Top candidates have multiple options during highly competitive market conditions requiring managers to look for unique solutions which diverge from competition. Prior to this study there has been very little research considering national laboratory research and development challenges from a technical hiring manager's talent acquisition perspective. Utilizing a unique combination of national laboratory multi-organization survey, pilot study, Human Resource (HR) tracking data and trust based business strategy to enhance partnering this research finds hiring managers can leverage out of the box techniques to improve internal processes while developing industry support to target highly qualified individuals. This methodology could be utilized by technical hiring managers across federal national laboratory enterprise to effectively capture next generation staff and leadership talent who align with their organization professionally as well as social culture.

ACKNOWLEDGMENTS

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LIST OF ACRONYMS

Acronym Label	Acronym Meaning
ABET	Accreditation Board for Engineering and Technology
ALDFO	Associate Laboratory Director Facility and Operations
EAC	Engineer Advisory Council
HR	Human Resources
LANL	Los Alamos National Laboratory
PPO	Partnership Pipeline Office
STEM	Science, Technology, Engineering and Mathematics
TASED	Talent Acquisition in Scientific and Engineering Disciplines
TA	Talent Acquisition
THM	Technical Hiring Manager
TPL	Tipping Point Leadership

INTRODUCTION

Talent Acquisition has been a labor relation and human resource management discipline. Most research focus surrounding talent acquisition is been from a social science centric review (Nikolaou & Oostrom, 2015; Examining Federal Managers' Role In Hiring, 2018). Based on available literature and industry norms these enterprise department resources struggle to discuss breadth and depth of technical opportunities necessary to maintain engagement of a STEM personality. Potential candidate eyes light up during the description of an environment where someone is able to challenge themselves professionally through unique theoretical problems requiring a matrix multi-discipline team of industry experts to gather for solution creation, while simultaneously these same talents leak out into community based hobby clubs like astronomy, robotics, rocketry, metallurgy and athletics. The face to face success observed during industry outreach highlighted the need for talent acquisition strategy which pulled technical hiring managers out from behind their desk and promoted hands on engagement with the hiring process. The project management divergence business tactics utilized to advance the research is unique to available body of knowledge. Data presented has no pre-existing research found during literature review reflecting talent acquisition from a national laboratory technical hiring manager perspective.

Technical hiring managers receive theory based training for their designated discipline. These individuals are promoted for their technical prowess and not necessarily for soft skills crucial to successfully attract talent.

Traditional Process;

- Technical hiring manager produces a job description, including minimum requirements, set of desirable duties and skill sets their new hire would be expected to fulfill (Muller, 2009).
- The bulleted list of skills are added to human resource job ad posting. Postings are listed on the enterprise career web page. If proactive a human resource representative may

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post the job ad on social media platforms; such as, Facebook, Twitter, Instagram vs. traditional job boards like Linked In, Indeed or USA Jobs (Walford-Wright & Scott-Jackson, 2018).

- The hiring manager reviews resumes at some future date once enough perceived applicant quantity is obtained.

- The short list of candidates would be handed to an administrative role to schedule interviews. Post interview selection is made and the chosen candidate receives an offer. The period of time between job posting and offer made could span months (Examining Federal Managers' Role In Hiring, 2018). At this time the hiring manager may learn if desired hire is interested or even still available.

- If an offer package is accepted the next step is a time consuming Federal background check.

The above mentioned long drawn out process lacks proactive personal touch maintaining engagement with perspective talent. In a competitive market where young tech centric high performers are getting multiple offers the instant gratification generation become frustrated looking to gain rapid stability in their career path; thus, resulting in a lower rate of optimal talent capture.

Modern approaches enable both sides of the transaction (employer and potential employee) to test waters and determine if there is a mutual fit.

Modern Alternatives;

- Another approach to hiring is developing talent pipelines through the use of tryout alternatives where an individual is given the opportunity to act within the specific role being filled for a designated period of time enabling management to observe and determine if there is success factor to permanently fill the position (Sterling & Merluzzi, 2021).

- Department of Energy has introduced programs like Energy I-Corps which walks federal laboratory researchers through a two month intensive entrepreneurship and commercialization training, which could be seen as a value add for potential recruits to learn about as an incentive to hire on, but is not being effectively utilized (Wright, 2021).

- Leveraging a Lean Six Sigma approach could benefit the enterprise process as well. Lean enables effort waste reduction, while Six Sigma increases organizational efficiency, improves customer satisfaction and reduces cost. Establishing an understanding of the Lean Six Sigma improvement evolution should aid to set realistic team expectations for initiative, because they understand what process stage they are enabling more rapid adoption (Van Duren et al., 2015).

Improving technical hiring managers ability to target STEM talent may require understanding internal corporate processes, individual trust based behavior techniques and external factors relating to hire outcomes could be critical to achieve a higher capture rate. Recent literature exposes the need to understand market and organizational hiring frictions as key factors to create successful acquisition program. Highly competitive market conditions find positions remain unfilled (Weaver 2021). There is very little to no data from national security institutions representing a hiring manager perspective of the process and factors either hindering or enabling regulated government sector talent capture. The following case study reflects upon traditional hiring process from a technical mangers perspective to find transformational leadership innovative to enhance long term hiring success quality (Mangisa et al., 2020).

STATEMENT OF THE PROBLEM

Attracting technically trained talent to remote and highly regulated government research facilities is a multi-faceted challenge. Furthermore, ensuring the social style and type of personality is a fit for both the laboratory culture as well as the community environment is crucial for retention. There has long been an undertone that hiring practices within the federal science and technology sector are outdated approaches which hinder a hiring manager's ability to effectively attract sophisticated talent (Wright, 2021). LANL has fallen behind peer national laboratories with a slower pace to identify and attract talent based on recent institutional bench marking pilot study, see Figure 1 below. Attempting to compete against higher profile and quicker to respond private sector firms is also potentially hindering LANL's ability to ramp up talent acquisition capture necessary to support mission growth. Instead national laboratories should be looking for divergence opportunities to eliminate head to head competition with industry.

Per interviews with LANL stakeholder entities a reoccurring theme surfaced reflecting disagreement between human resources and technical hiring organizations. Each state the other is responsible for delays and associated lost talent capture. Debate resolution has been hampered by lack of data to identify actual areas for improvement, what resources are available to a hiring manager to assist with the talent acquisition process, who is responsible for actual delays in process, who is empowered to advance the hiring expeditiously as well as identified techniques to effectively execute talent acquisition. The school of thought is case study may aid to expose these nuances and provide context upon which to build awareness and attention toward resolution at an institutional level.

The talent acquisition research focused on highlighting a deficit in National security laboratory ability to attract high caliber STEM hires. One of the potential causes is a perceived lack of technical hiring managers understanding of how to effectively perform talent acquisition by gaining support from enterprise resources and industry. Survey and pilot study were structured to perform national laboratory hiring manager stakeholder outreach to gather data surrounding the

hypothesis assumption. This gap analysis was intended to aid both the stakeholders and HR to identify opportunity for refined collaboration. Second the research focused on providing tools to a technical hiring manager by testing the application of modern business strategies when leveraged aid to build trust based partnerships both within their respective internal corporate enterprise and external with talent generating pipeline entities to increase capture of quality talent.

Compounding problem statement issues for reference;

   Historically National Laboratories could rely on their scientific legacy to attract talent. However, lack of brand status awareness amongst younger generations due to a relatively long period of global peace has resulted in a dearth of top talent not actively seeking out National laboratory opportunities (Bidwell et al., 2015). Additionally, the hiring process and Federal background checks are time consuming, which in a competitive market where high performers are getting multiple offers, the younger tech centric and instant gratification generation does not have patience to wait for an offer package. The average hire duration for a federal employee has been steadily increasing from 90 days in 2013 to 106 days by 2017 (Examining Federal Managers' Role In Hiring, 2018). In fiscal year 2019 the LANL hiring cycle time (job posting to offer) averaged 111+ days based on annual hiring data. In comparison, when benchmarked against peer National laboratories LANL took on average 39% longer to execute a hire while performing talent acquisition, see Figure 1 below for National Laboratory Hiring Time Benchmark data.
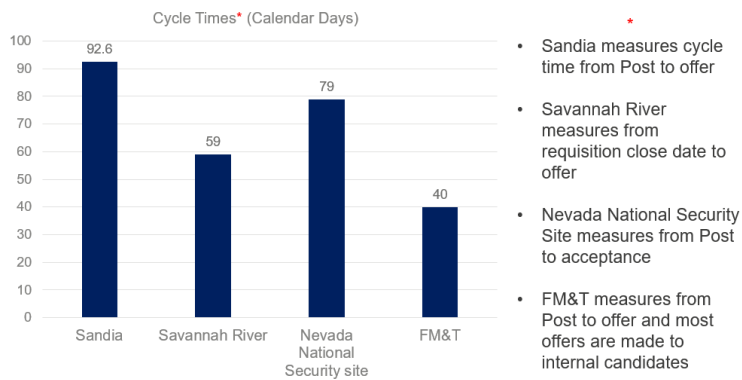
Figure 1 National Laboratory Hiring Time Benchmark

With increasing mission and attrition rate compounding to strain talent acquisition, hiring managers should leverage additional tactics knowing fixed variables such as security background check timeframe are a minimum requirement. If technical hiring managers can minimize pre-job offer churn with a hands-on approach, the amount of lost talent acquisition and manager effort could dramatically convert into increased top talent hiring rates. Therefore, a focused approach should be untaken to optimize talent capture and retention to maximize the hiring manager investment effort.

A current determinant is innovation may be hindered by limited foresight from senior management who developed their methods around competing within an accepted head to head battle with more agile private sector corporations vying for the same limited talent pool available within current market environment (Kim & Mauborgne, 2005). Where hiring manager time, lost productivity as well as the financial impact from either losing a potential candidate resource or not hiring the optimal talent culture fit to align with a particular laboratory mission is accepted practice.

For example, assuming minimum 30 hiring managers for engineering services division alone plus administrative support the following is a rough financial cost benefit analysis.

- Hiring Manager = $175.00 per hour rate

- Administrative Support = $75.00 per hour rate

- Need security personnel rate for complete investment = $100.00 (assumption)

- Travel reimbursement per potential candidate = $1,800.00 (approximate)

LANL engineering services invests a minimum of 6 hours per above mentioned resource on each potential hire. Tasks involve: vetting candidate resume, holding an initial teleconference interview, conducting in person interview, performing an interview committee determination to select the successful candidate, gathering references as well as evaluating an initial security review. The previously mentioned process is required prior to developing a formal hire package and performing follow-up phone calls to maintain interest during the long drawn out National laboratory process.

LANL is an intricate organization comprised of 122 divisions, programs and offices. To conduct the unique science and associated operations, LANL must attract scientific and engineering talent across all disciplines to sustain approximately 13,000+ personnel supporting mission activity. With LANL attempting to hire nearly 1200+ new staff per year for the next several years, our financial and time investment is significant. Typically, we interview a minimum 3 applicants per position. Out of the selection approval process, LANL has approximately 37% loss recruitment rate average per year as the successful candidates pass through hire process. Assuming lost investment per person is equivalent to $3,900.00 * 444 individuals per year this would equate to $1,732,000.00 minimum non-recoverable cost per year, not accounting for hiring manager lost sweat equity, for the engineering division alone.

LANLs hiring process and Federal background checks are time consuming, which the younger tech centric and instant gratification generation may not have patience to wait for an offer package in a competitive market. With increasing mission and attrition rate compounding to strain our talent acquisition hiring managers may want to consider leveraging additional tactics which look across division boundaries for value-innovation to make competition irrelevant.

CASE STUDY OBJECTIVES

By leveraging a smart business philosophy known as Blue Ocean Strategy (Kim & Mauborgne, 2005) the premise is to avoid an exhaustive battle against both internal as well as external competitors for the limited available resources. Utilizing trust based partnerships within a complex National laboratory environment technical hiring managers have the potential to perform incremental process improvement during early talent acquisition. Systematic building of a collaborative process to identify the vacant positions, hire suitable technical talent and maintain continuous focus on retention to achieve long-term objectives is crucial to our National laboratory's mission success. TASED explores how to leverage a transformational business trust based partnering strategy to develop a sustainable talent acquisition competitive edge within science and technology field. For technical hiring managers to excel, they should become extroverted social science specialists who can sell factors which differentiate their work environment from the competition. Once trained, hiring managers should be able to highlight professional and personal experiences, culture, climate, proximity to top notch schools and other local amenities to help represent a unique work-life balance career opportunity. Armed with talking points; such as, professional training, career advancement opportunities, easy access to hiking, cycling, or downhill ski/ snowboard opportunities over a lunch hour is an eye opener once individuals learn about our attractive lifestyle. The technical professional excitement and level of explanation does not come through a job ad nor social media posting. To gain highly qualified individuals attention managers should conduct empathetic outreach sessions to develop enduring pipelines for talent capture.

LANL's DNA offers its workforce an outstanding corporate culture and work experience. Located in the heart of northern New Mexico along eastern slopes of Jemez Mountains, the National laboratory operates in a location providing employees with a great place to enjoy life with coworkers, family and friends while remaining technically challenged throughout an entire career within a unique, centralized and extremely diverse professional environment. The above

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mentioned examples create an immediate smile across the potential candidate's face when articulated with excitement. This type of informative dialogue is not necessarily successful, at the highest percentage rate needed to fill our ranks, while hiring managers attempt to operate from behind their desk in rural northern New Mexico. Hiring managers need to physically reach out to centers of excellence, meet face to face and develop relationships necessary to entice individuals to consider LANL. Market intelligence will help advance LANL's talent acquisition. Developing target maps of marketable technical talent supply and cross walking with the laboratory's 5 year department wide hiring demand will position managers for smart acquisition strategies. Leveraging social tools such as LinkedIn may help identify potential experienced candidates who are willing to consider a career at LANL; however, social media job postings may not improve branding and intrinsic awareness of the rewarding LANL professional work-life balance opportunities which exist. Sharing the laboratory culture is also important to ensure the right personality fit is hired so candidate is successful.

National Laboratories may need to be flexible with the next generation of staff who may be growing their families. Enabling new parents to have flexible schedules so that they can care for their children is beneficial to staff as well as the organization. The COVID 19 pandemic has proven that telework and/or hybrid schedules could be a viable option for a significant portion of laboratory personnel, which is quickly being embraced by management. A flexible approach to work can increase worker satisfaction, productivity and serve as incentive to attract top talent.

Establishing a mentoring program to support growth and development demonstrates that staff are valued and there is a future for them. In addition to offering employees valuable guidance, formal mentor programs communicate a long-term commitment to employees, aid in recruiting as well as retention efforts (Business Jargons, 2019). Using a systematic approach to defining job competencies and performance, technical hiring managers should also be able to illuminate opportunities to candidates by highlighting development and career path opportunities

(Mason, 2016). LANL has some excellent incentives, career advancement opportunity and challenging technical work, but struggles attracting the right talent.

Out of the box thinking may help to identify new ways to attract talent beyond job boards and National laboratory career websites. Technical hiring managers should consider participating in online message boards, sharing job openings via professional associations, establishing a presence at outdoor enthusiast locations like ski resorts, cycling events, hunting clubs and 4x4 adventure outings. Technical talent who share the same extracurricular interest as the laboratory culture are worth the investment due to higher retention potential.

Hypothesis #1: In National Security laboratory environments STEM hiring managers are not trained nor aware of how to effectively perform talent acquisition by gaining support from enterprise resources.

Hiring manager technical management skills typically develop during their science, technology, engineering and mathematics career. Hiring managers may not capture a complete set of soft skills to successfully partner with stakeholders vital to success during a talent acquisition campaign. Talent acquisition process means dealing with real human concerns and needs which requires flexibility, agility as well as empathy enabling hiring managers to respond effectively based on each unique individual situation encountered.

Hypothesis #2: Leveraging modern business strategies to build trust based partnerships both within their respective internal corporate enterprise and external with talent generating pipeline entities increase technical hiring manager ability to capture quality talent.

Within a large National laboratory such as LANL, a technical hiring manager should leverage a tipping point leadership philosophy to ensure success, see Institutional Influence Strategy under Methodology below for detail. Hiring managers should identify their best technical sales force from within to promote the laboratory. TASED explores the initial phases of a

National laboratory technical hiring manager's experience working to improve talent acquisition skill set. By gathering support from a diverse set of hiring managers, human resource specialists, Partnership and Pipeline Office as well as laboratory leadership a hiring manager should be able to gather data, brainstorm solutions and create synergy around modern talent acquisition, see Figure 2 outlining above mentioned process.

Talent Acquisition
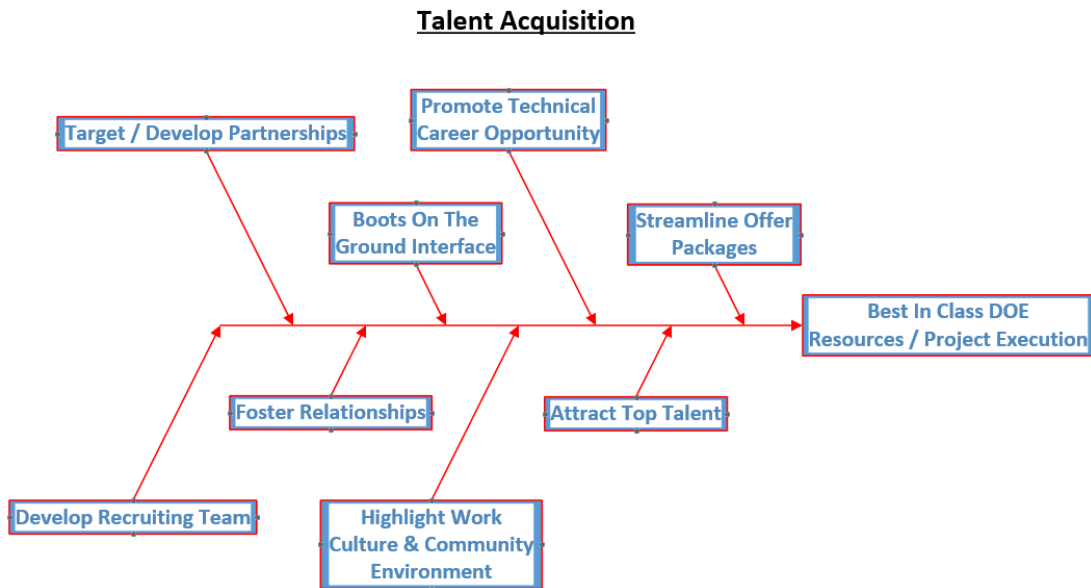
Figure 2 TA Process Model

Figure 2 reflects this researcher's technical hiring manager approach to talent acquisition based on years of both private and federal sector portfolio management experience. To successfully tackle a targeted initiative it requires team alignment and peer as well as leadership support to help advance the effort. To build a collaborative team rapidly requires soft skills to establish trust, effective communication techniques to bridge new relationship limitations and face to face meetings to interact with individuals on their turf. Making the effort to travel to someone's location (business partnership or potential hire) immediately creates engagement interest due to endeavor to meet in person which creates an early comfort level. This approach could be replicated across multiple industries and talent acquisition fields.

METHODOLOGY TACTICAL THEORY

Institutional Influence Strategy

LANL is a very complex National laboratory environment employing thousands of individuals who have a role associated with talent acquisition efforts. Streamlining talent acquisition implementation to create efficiencies has been given a high priority. The goal is to aggressively identify ways to attract highly qualified talent. One approach is to implement a business tactic known as Blue Ocean Strategy which is a private sector business development model that could be morphed into a solution for National laboratory leadership to consider. This case study narrows focus toward a few principles of Blue Ocean Strategy and how social trust development intertwines to advance initiatives like TASED.

- First, tipping point leadership will be reviewed and how this strategy overcomes key organizational hurdles to Blue Ocean Strategy.

- Second, an important part of tipping point leadership is successful trust creation and the social complexities associated.

- Third, a discussion will follow pertaining to the topic of how institutional leaders can formulate a strategy to reconstruct boundaries.

Blue Ocean Strategy primary goal is to help leaders streamline accessing innovative solutions (Kim & Mauborgne, 2005). This strategy was chosen due to its ability to bring stakeholder leadership together and problem solve a business challenge like ramping up talent acquisition success. The other key focus is how an organization creates divergence from competition which is critical when there is a shortage of talent to support market demand.

Tipping Point Leadership Model

Tipping Point Leader is a participative approach to leadership (Vroom & Yetton, 1973). Winning stakeholder support to break from the status quo is key when creating a fundamental shift in the organizational culture and strategy. When successful, a performance leap and

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benefits for all stakeholders could be achieved. Managers consistently face four hurdles to execute the Blue Ocean Strategy (see Figure 3).
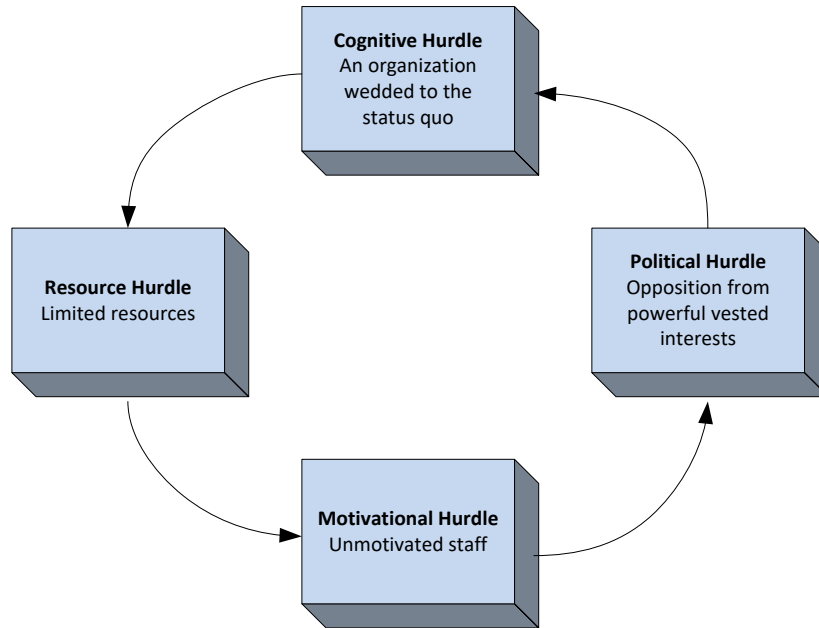
Figure 3 Four Hurdles to Blue Ocean Strategy (Kim & Mauborgne, 2005)

To break through the cognitive hurdle, a tipping point leader should work to elevate awareness of the need for a strategy shift. Neuro and cognitive science research have proven that people remember and respond better to what they see and experience (Tyng et al., 2017). Managers should work to identify and address known challenges to gain support. Jumping the resource hurdle is accomplished by reallocating low-return resources and directing them toward high-impact areas. To overcome the motivational hurdle, a leader should concentrate their effort on kingpins (key influencers in the organization) vs. the masses. Less experienced managers can jump the political hurdle by leveraging a consigliere from a strong stakeholder organization to advance even while naysayers dismissed the effort as not worthy of investment. A consigliere is a politically adept and highly respected insider who knows in advance all the "land mines" to avoid. A tipping point leader's goal is to identify what factors or actions exercise a disproportionately positive influence to execute core organizational change fast and at low cost (Dirks & Ferrin, 2001).

Tipping point leader strategy requires counter-intuitive focus to influence the extremes rather than a frontal approach to push masses toward a goal, as shown in Figure 4 (Kim & Mauborgne, 2005). To accomplish change the key is through changing attitudes and behavior. Successful leaders work to gain trust, commitment, and voluntary cooperation. Psychological research provides insight into what makes people trust, why people's commitment correspondingly rises, and what drives an individual to exert energy and initiative to the best of their abilities (Diamond & Zeisel, 1978).

Convential Wisdom

Mass of Employees

Company
Theory of organization change rests on transforming the mass. So change efforts
are focused on moving the mass, requiring steep resources and long time frames

Tipping Point Leadership

Extremes

Company
To change the mass, focus on the extremes-people, acts and activities that exercise
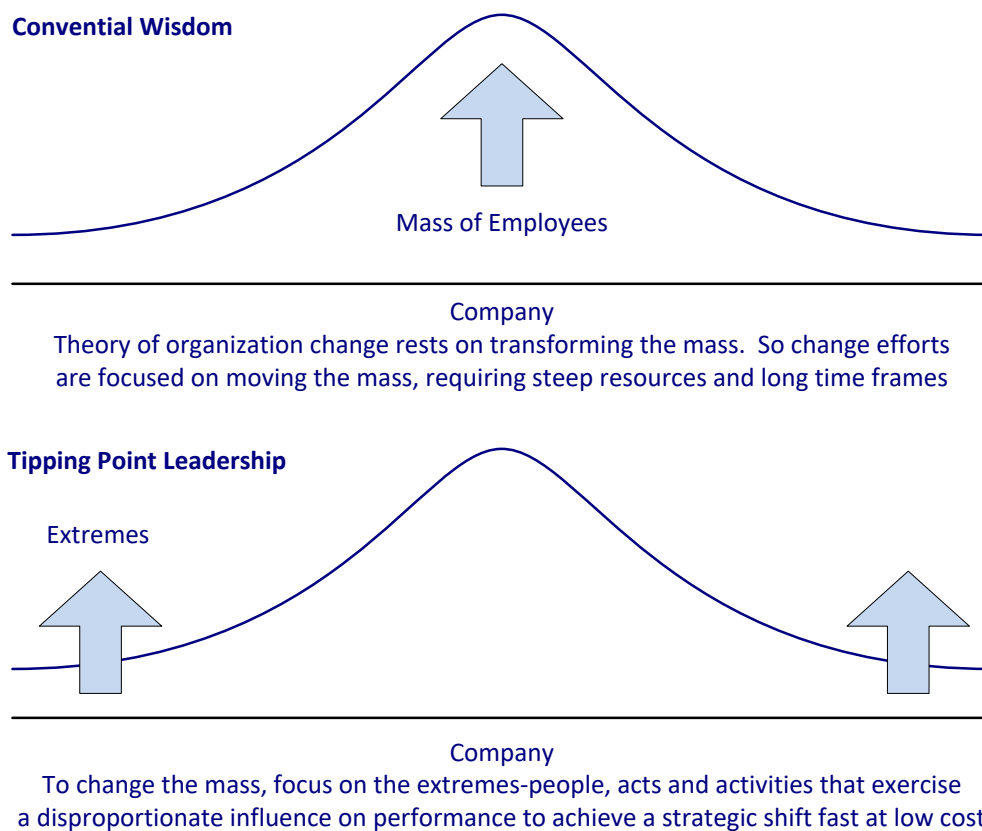a disproportionate influence on performance to achieve a strategic shift fast at low cost.

Figure 4 Counter Intuitive Influence Approach (Kim & Mauborgne, 2005)

Partnership Trust Creation

Societal constructs, in general, depend on trust to exist. Without trust, all contingent possibilities must be considered, leading to a paralysis of inaction. Trust can be seen as a gamble on a contingent future, the one that may deliver benefits. The trustor understands that the possibility of a negative course of action is outweighed by the reward. Trust reduces social complexity, allowing for actions that are otherwise too complex to be considered (Colquitt et al., 2007). People work together and achieve success through trust by relying on each individual's contribution (Mayer et al., 1995). Conversely, where trust is absent initiatives can fail, especially if the lack of trust has not been identified and addressed. Identifying and dealing with cases where stakeholders do not trust one another early and often can help reduce initiative risk factors. There are three key aspects to trust: 1) trust results in being vulnerable to someone even when they are trustworthy; 2) trustworthiness is the characteristics or behaviors of an individual that inspire positive expectations in another person, and 3) trust results in a propensity to rely on other people (Colquitt et al., 2007). The trust diagram represented in Figure 5 graphically depicts a
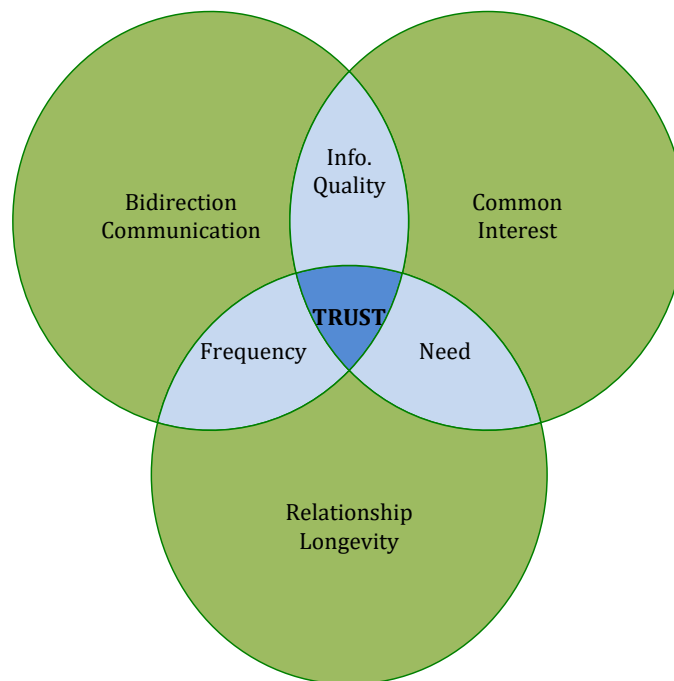

Figure 5 Trust Influence Diagram

concept of overlapping influences that contribute to create interpersonal trust amongst partnering stakeholders.

By understanding the Trust Influence Diagram, a technical hiring manager could identify which factors need to be leveraged along with their associated importance to the desired partnership success. For example, if the relationship is young, other influences such as communication frequency should be increased to maintain a positive level of trust. Definitions of trust typically are characterized by the following; the trustor is willing to rely on the actions of the trustee and accepts reduced control over the actions performed by the trustee. As a consequence, the trustor is uncertain about the outcome of the other's actions; the trustor can only develop and evaluate expectations. Uncertainty involves the risk of failure or harm to the trustor if the trustee does not behave as desired (Mayer et al., 1995). Due to the National and international economic influence and technology advances, technical hiring managers should look to expedite trust creation amongst support entities as well as with identified talent to keep on pace with expectations. Being able to identify how and when trust is established may help hiring managers create relationships more efficiently.

Reconstruct Boundaries

Blue Ocean Strategy provides multiple concepts based on the author's research for consideration. One worth highlighting is the Four Actions Framework (Kim & Mauborgne, 2005). These are designed to aid leaders in evaluating current service lines or offerings against expectations. The goal is to perform introspective reviews to identify opportunities for value-innovation.

Four Actions Framework

To break out of the Red Ocean trap, National laboratory technical hiring managers should consider reaching beyond accepted boundaries that define how we compete for technical talent. Instead of looking within siloed division boundaries, managers should systematically look across them to develop new partnerships which can aid formulating unique unforeseen strategies.

There are 4 key questions which challenge the standard industry logic and business models to create new value (see Figure 6). The first question forces us to consider eliminating factors that no longer benefit; thus, enabling cost or schedule reduction. One example is hiring managers sitting on long job ad postings waiting for resumes to pile up when the data suggests the preferred applicant ultimately hired applied within the first thirteen days of listing, see Results of Hiring Pilot Study for detail. The second question forces us to determine whether virtual branding / job opportunity postings have been overdesigned during the race to beat competition; thus, increasing cost structure for no gain. Reducing the level of refinement to an acceptable standard will streamline production; thus, enabling a cost-effective outcome allowing funds to be targeted toward pipeline outreach. The third question forces us to uncover and eliminate compromises we have been forced to take; such as, passively waiting for the right applicant to land on the desk vs. performing old fashion boots on the ground interface with potential hires. Finally, the fourth question helps us to discover entirely new sources of value.

Reduce
Which factors should be reduced well below the industry's standard?

Eliminate
Which of the factors that the industry takes for granted should be eliminated?

A New Value Curve

Create
Which factors should be created that the industry has never offered?

Raise
Which factors should be raised well above the industry's standard?
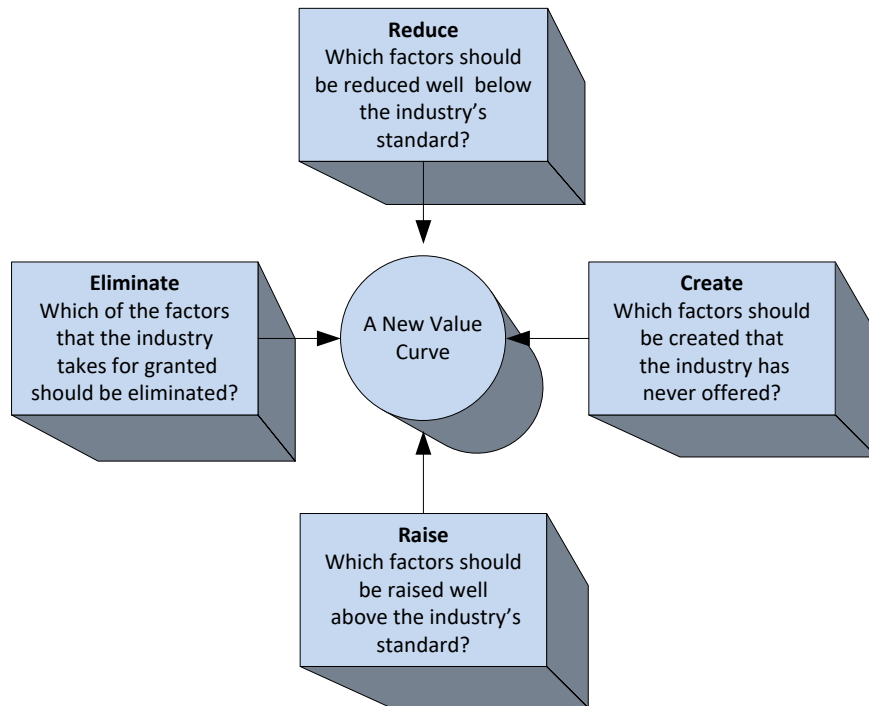
Figure 6 The Four Actions Framework to Reconstruct Mission Boundaries (Kim & Mauborgne, 2005)

What would happen if we shifted focus and how would we unlock new value for potential recruits thereby creating new demand. An example is providing extended co-operative semester based opportunities where relationships can be built between student and laboratory management. One could determine how National laboratories can eliminate our potential new hire struggles by bundling services; such as, initiating early job offers prior to finishing a degree and providing financial assistance to complete degree which would eliminate stress for the student/hiree. Early job offers have the potential to diverge from Red Ocean competition by locking in the relationship with candidates who are a culture fit prior to the industry standard graduate offer, therefore, essentially eliminating competition for targeted talent. Creating new options for NNSA and DOE by providing expanded benefit would increase desire and excitement for National laboratory careers. Four Actions Framework questions are designed to get the tipping point leader thinking "outside the box". The counterintuitive thought process enables managers to assess business standards from a different perspective thereby visualizing a potential value-innovation.

Once the Four Actions Framework analysis is complete, the tipping point leader should be able to develop the three characteristics of Blue Ocean Strategy. First, efforts should not be diffused across all factors defined by the competition but rather focus only on key elements the potential recruit desires. Second, counterintuitive thought would have technical hiring manager avoid benchmarking competitors but instead looking across internal directorates to identify new solution alternatives, so divergence from competition can be created. However, sometimes enterprise political pressure requires complying with old recognizable strategies to gain leadership support as reflected in Statement of Problem previously. To reach the desired talent base, National laboratories should establish the third characteristic, which is a compelling brand / tagline; such as, "Technical Career Diversity Within One of a Kind Work Life Balance Environment". Without these qualities, the strategy will be undifferentiated and hard to

communicate. Talent acquisition should also develop strategic selection criteria, to hire the most qualified candidate who also is the best fit in the laboratory culture to execute technically challenging work.

IMPLEMENTED METHODOLOGY / RESULTS

National Laboratory operating environments are extremely complex and require due diligence and persistence in order to be successful. Focusing effort to foster relationships across division managers by created opportunities where team-building sessions could be held managers were able to confide (through cognitive acceptance and social trust), their goals for identifying opportunity and development of new unrealized cross-division advances toward talent acquisition initiative. By effectively collaborating, stakeholder partners identified a need and formulated unique solutions to help accomplish their common goal.

Partnering entities had to gain a comfort level with each team member and their ability to share the initiative risk. The goal was work together to establish a co-creative environment and resolve problems that currently plague talent acquisition, see Statement of Problem section above for detail. To expand available diverse technical staff resources TASED leveraged a three-step process to achieve an incremental shift toward modernized national laboratory talent acquisition.

Step #1, Internal resource stakeholder partnering:

To increase success rate, a technical hiring manager should quickly identify those internal departments and associated leadership to understand types of available resources and legal requirements which must be followed to properly perform industry outreach. As a National laboratory, LANL has internal talent acquisition expertise embedded within a newly formed Partnership and Pipeline Office and a multi-faceted Human Resources department. Initiating TASED within partnership and pipeline and human resources offices was desirable because they were seen as a neutral party, thereby creating trust for all stakeholders who may get involved.

Information was exchanged so TASED strategy could be evaluated, studied, and ultimately atomized.

The key components of the strategy were identified and necessary expertise areas (technical hiring managers, human resource Generalists, partnership and pipeline support, as well as industry partners) gathered via a small core team. The team crossed laboratory mission boundaries to provide the laboratory with an accountable solution. This technical hiring manager applied cognitive trust building techniques represented by the outer ring in Figure 7 to ensure a strong set of partnerships were developed early in the process. Positive interaction gave hiring managers increased confidence to push for initiative involvement within their own perspective divisions. Trust was required prior to management investing equity to travel and hold institutional leadership partnering meetings, to develop white papers, presentations, and to implement proof of concept. Comfort level between partners occurred slowly over months, with weekly professional meetings and occasional social interactions.
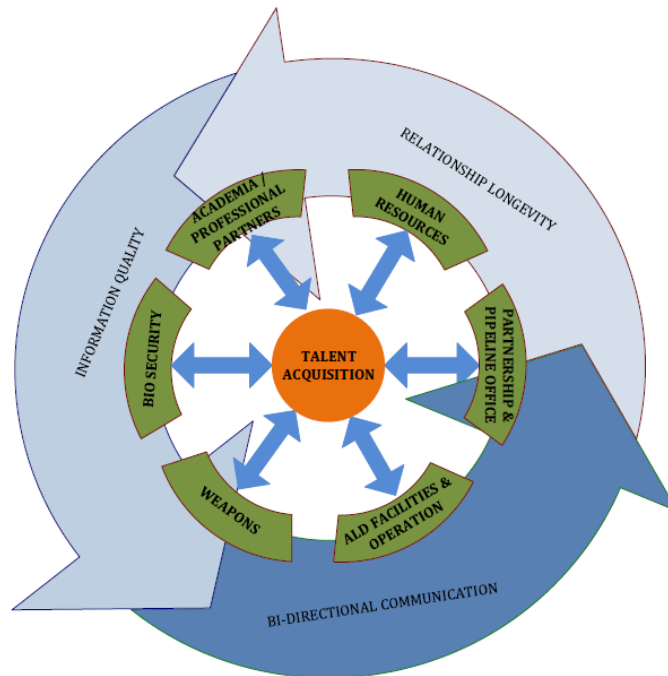

Figure 7 Process Stakeholder Cognitive Trust Building

Institutional Talent Acquisition Survey Results

Diving into the talent acquisition process, this hiring manager developed a unique relationship with internal human resource division stakeholder. Without a predetermined strategy, the human resource partnership grew organically. Preliminary sessions occurred between this hiring manager and the human resource Director. These meetings evolved, and eventually this hiring manager held sessions with human resource staff to share personal experiences attempting to perform talent acquisition from scratch due to lack of training nor awareness of institutional resource support.

During the discussions with human resource leadership it became apparent there was a common interest to improve and streamline talent acquisition. This technical hiring manager increased awareness of barriers to success. The grass roots effort expended by this hiring manager confirmed the human resource leadership suspicions regarding barriers to performing effective talent acquisition and determining how best to perform outreach amongst internal laboratory customer base. To improve collaboration this hiring manager's experience was shared freely as a knowledge gap representing challenging learning curve encountered. Human resource services were described as not obvious to technical leadership deployed across the institution and the information shared helped to immediately build a trust based relationship. The suggestion was made to conduct a survey of hiring managers, so that human resources could validate this hiring manager's observations. The survey would help partnership and pipeline as well as human resource office leadership understand how extensive the gaps were in awareness of available human resources and National laboratory protocols to assist in talent acquisition, amongst technical hiring managers. Initial stakeholder meetings were held to formulate strategic questions with a goal of capturing honest and unbiased data for process improvement. Therefore, a set of survey question suggestions were shared with human resource leadership from the technical hiring manager perspective and experience. These were a catalyst to conduct

a National laboratory stakeholder survey. This initial survey was geared toward helping develop a bridge between technical hiring managers and human resource specialists.

The human resource services awareness survey was broadcasted to technical hiring managers spread cross 122 Divisions, Programs and Offices which fall under four primary directorates. The survey received 114 respondents approximately 46% from this hiring manager's directorate (operations). Ultimately, the survey not only enabled talent acquisition refinement, but also elevated technical hiring manager awareness surrounding professional support services to promote their individual team needs. The interface between the human resource team and this hiring manager ultimately confirmed a lack of awareness as well as limited support received by the laboratory's facility operation and maintenance division, which incorporates this technical hiring manager's division, see Figures 8 through 12 for results.
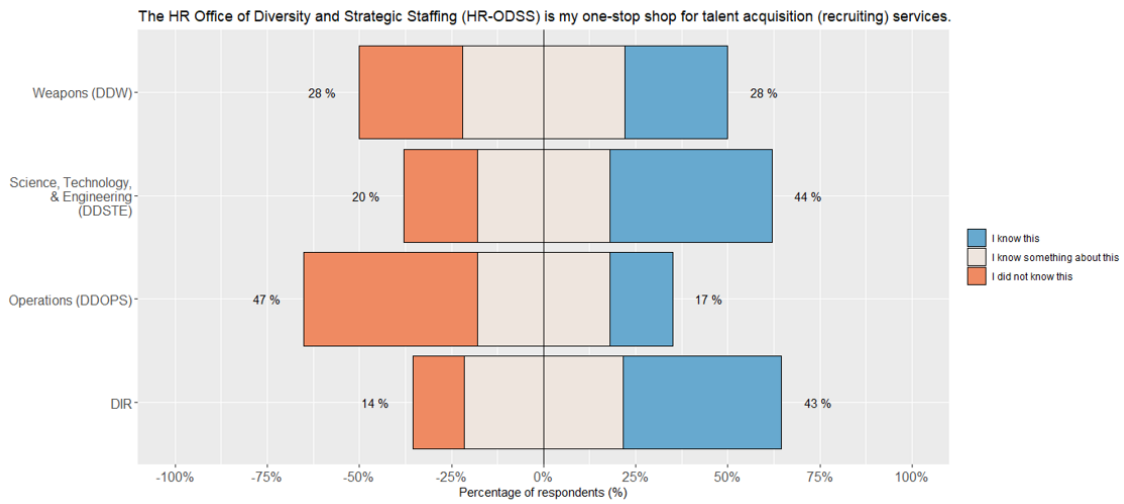
Figure 8 HR Available Services Awareness per Associate Laboratory Directorate

The Laboratory has a Recruitment Event Management (REM) tool where I can register for a variety of recruiting fairs/events and receive training before I attend.
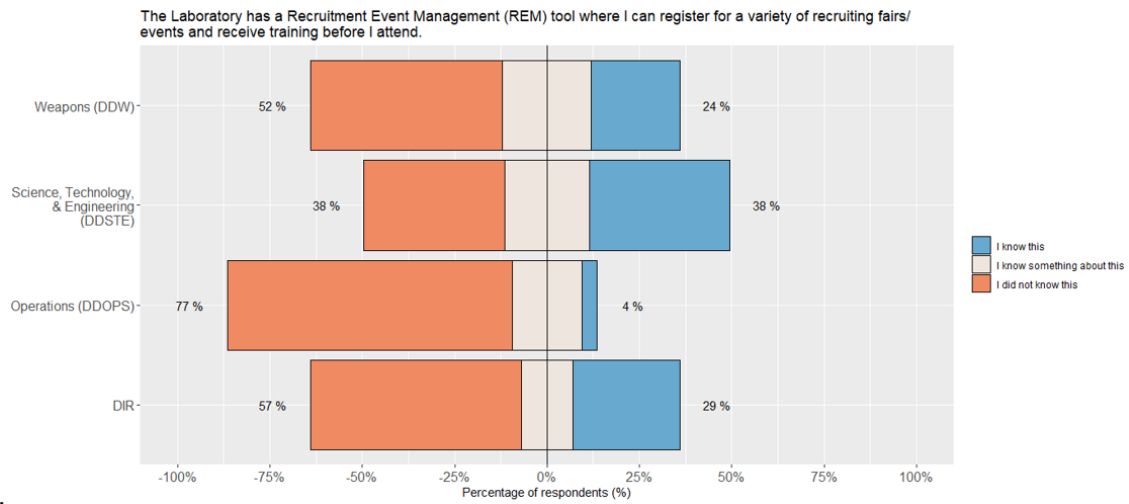
Figure 9 Lack of awareness (77% Ops) that laboratory had recruitment event management tool

Manage requisitions, including accurate dispositioning of candidates and keeping candidates engaged throughout lengthy hiring processes.
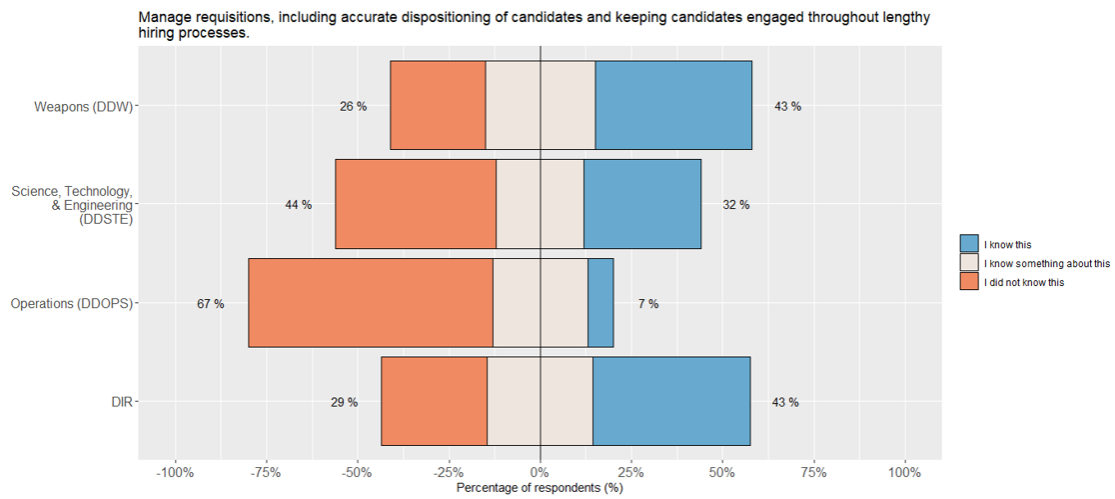
Figure 10 Lack of awareness (67% Ops) that human resources could assist to maintain candidate engagement

Develop ad campaigns to promote my open positions through Google.
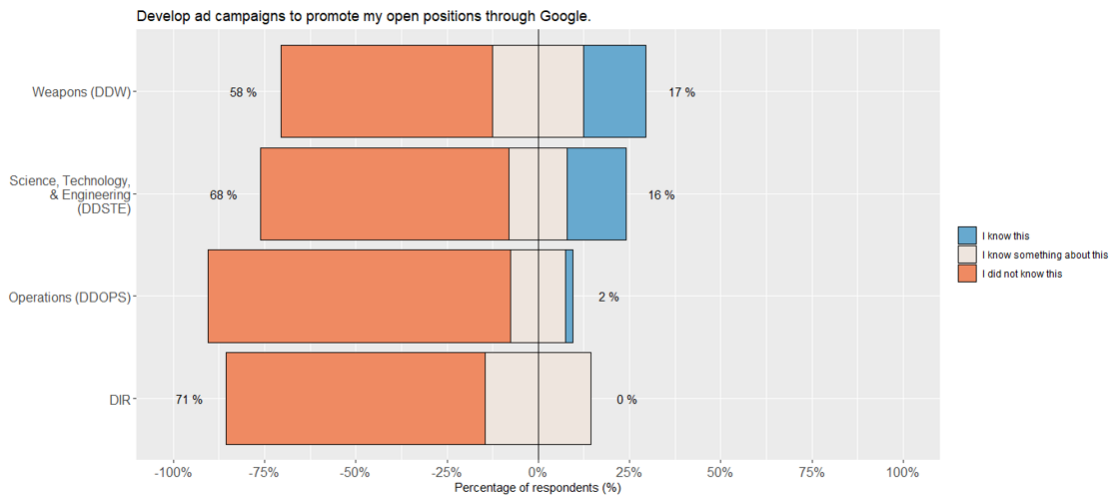
Figure 11 Lack of awareness (98% Ops) human resources could develop ad campaigns for open positions

Identify my organization's Affirmative Action placement goals and action-oriented plans to address them.
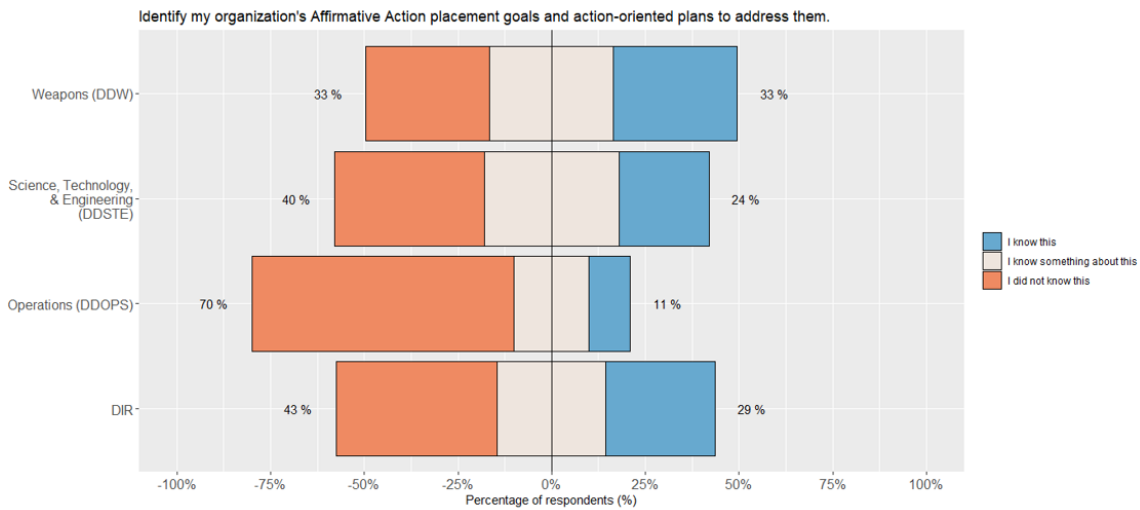
Figure 12 Lack of awareness (70% Ops) human resources could help with org. Affirmative Action placement goals

These responses provided confirmation there was a lack of awareness surrounding human resource services and hiring process protocols especially from institutional operations and maintenance (47% responded they did not know), see Figure 8 above. The effort has resulted in human resources assigning deployed human resource Generalists to improve collaboration and

support for operations and maintenance talent acquisition needs. This hiring manager specifically gained targeted help to build engineering talent pipelines due to collaboration.

Survey responses identified significant gaps across all Divisions, Programs and Offices, but operations was the most noteworthy reflecting an average of 60% "I did not know" responses across 18 survey questions. Further scrutiny reflects an average of 70%+ "I did not know" responses from operations across 10 of the survey questions. These survey results could reasonably be correlated to a lack of trust existing between organizations. These responses highlighted the lack of human resource service awareness nor comprehension of partnering opportunity to gain recruitment support; thus, validating this technical hiring managers initial experience. By assisting partnering entities (human resources and partnership and pipeline office) to target internal customer outreach the relationship created a stronger bond. The survey results elevated human resource and partnership and pipeline office stakeholder awareness creating immediate talent acquisition process improvements.

60 Days to Hire Pilot Program Results

Together technical hiring managers, partnership and pipeline office and human resource representatives worked to become more sophisticated by creating a data-collection process which tracked their talent acquisition implementation. Knowing that there was room for improvement the team first bench marked against peer National laboratories to learn LANL's average 111 days to hire a talented individual was well beyond competitors on average by 39%, see previous Introduction section Figure 1 above for detail. Human resource generalists shadowed technical hiring managers during a 60 Day to Hire pilot program tracking execution

25

cycle times. A steering committee of partnership and pipeline office and human resource leadership monitored the pilot with weekly report outs to track the progress.
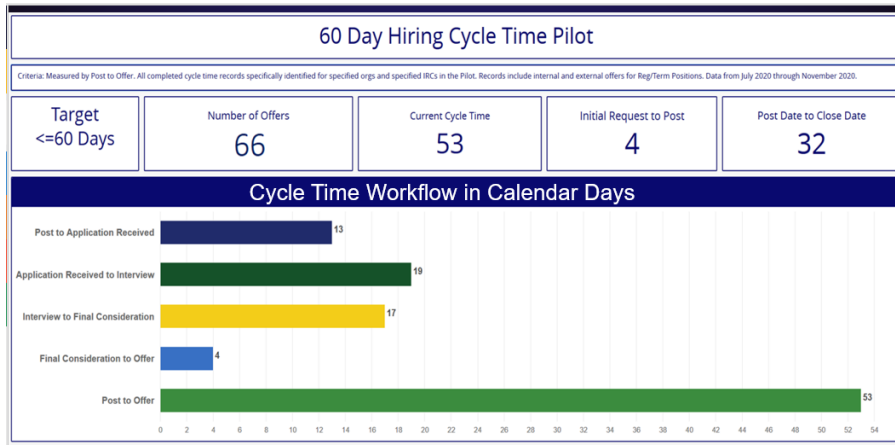

Figure 13 60 Day to Hire Pilot Program Cycle Times

One very valuable data point identified by the human resource pilot is the average applicant ultimately hired submitted their job application within 13 days of the job posting, see Figure 13 above. This enabled human resources to highlight for technical hiring managers that their job ad did not need to be up for an extended period of time which had been the typical protocol. Therefore new recommendations were made to change technical hiring manager tactics away from waiting for applicants to pile up before proceeding with interview process. Due to the pilot program it became clear that allowing job postings to extend beyond 30 days would typically not provide value add benefit and could cause the ad to become stagnant. Therefore, a pilot program recommendation was to begin scheduling applicant review and interview process calendar placeholders as soon as the job posting goes up. This approach is very similar to project management tactics and places responsibility for hiring process on technical hiring manager as critical path. Some organizations were found to be more task driven than others. Human resource generalists learned they need to help push process and keep technical hiring managers on task to aid with expediting hiring process.

Ultimately the 60 day to hire pilot program was successful. The 66 applicant offer pool was spread across the full gamut of talent from executive to craft resources, see Figure 14 below

for detail. The timeframe from job ad post to offer was reduced on average to 53 days, see Figure 15 below for detail.
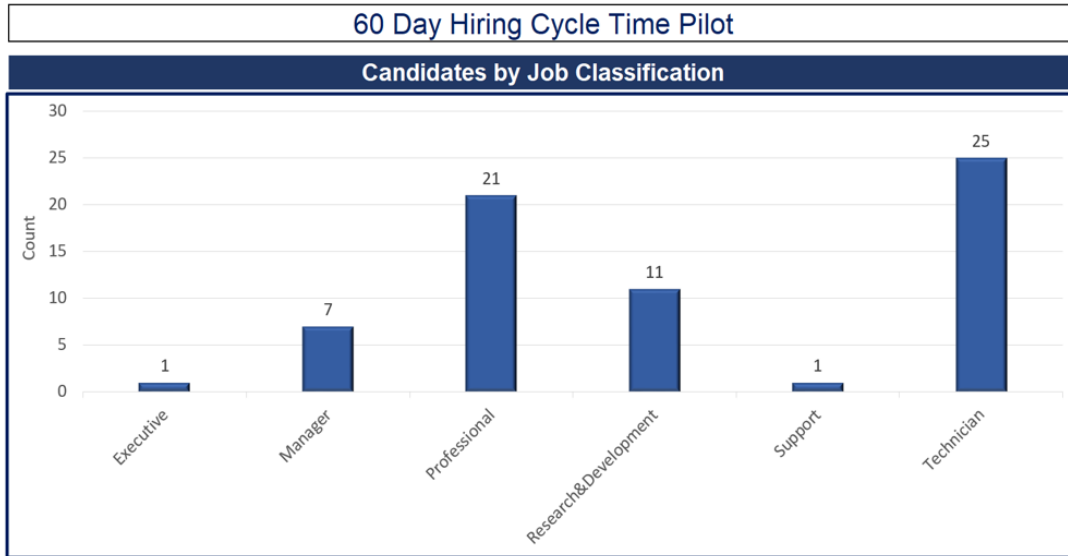

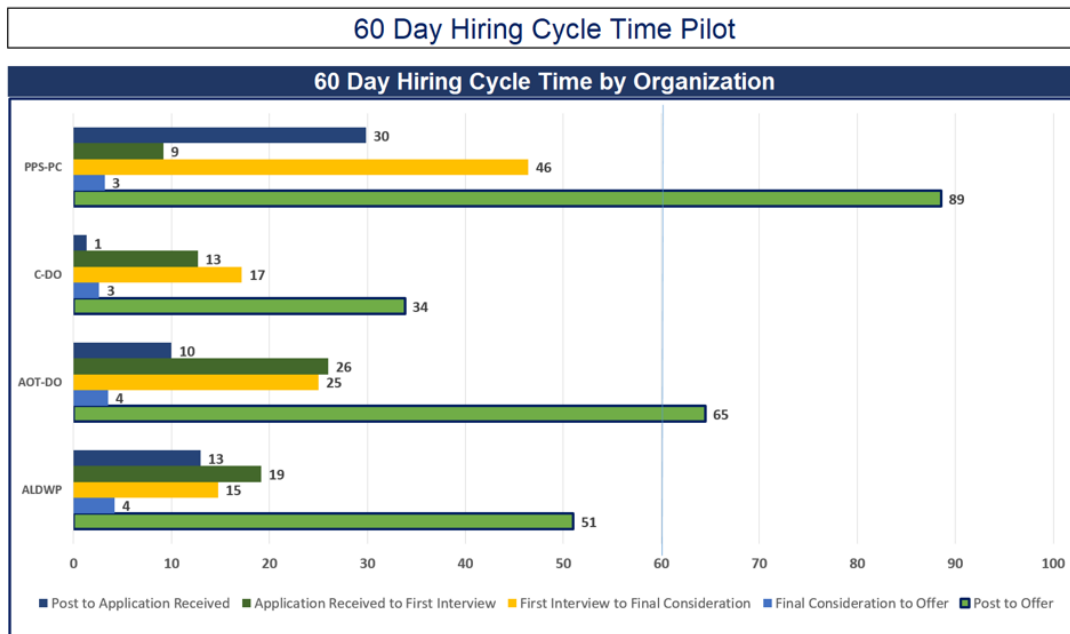*Figure 14 Hiring Cycle Canidates by Job Classification*

Figure 15 Hiring Cycle Time by Organization

Step #2, Developing external institutional relationships:

Technical hiring manager will increase their reach as well as support network when they seek out and gain process buy in from other internal technical hiring managers as well as senior leadership (Kingpins). By working together, technical hiring managers immediately expand each other's coverage and industry outreach. Internally resumes are now being shared amongst technical hiring managers who attend different recruitment events and are aware of the other's talent needs.

While attending and aggressively working a recruiting event, primarily to observe a successful weapons talent pipeline, this hiring manager met and developed a new unforeseen senior (consiglieri) military affairs laboratory leader relationship. By holding informal partnering discussions with the newly formed relationship, this hiring manager was able to find a common interest with east coast academic programs. As a result of rapid partnership development, this technical hiring manager gained support from senior National laboratory leadership to hold institutional partnering sessions at the close of spring 2019 academia calendar. This technical hiring manager and newly formed senior leader collaborated to perform unique outreach targeting a small remote University, which potentially held the right combination of blue collar work ethic, technical STEM disciplines as well as outdoor enthusiast characteristics to create a direct culture fit correlation for LANL (Blue Ocean). The LANL representatives held multi day, boots on the ground pre-scheduled meetings with senior university department chairs, college deans and president. These sessions were intentionally off typical industry career recruitment cycle creating competition divergence, so focus could be placed on partnership building, which impressed the university leadership. Due to these leadership discussions between institutions, an unforeseen yet purposeful Blue Ocean partnering opportunity evolved (Fitzgerald & Hughes, 2018). This technical hiring manager was invited to join the University's engineer advisory council. The engineer advisory council opportunity became a TASED value-innovation. This opportunity enabled this technical hiring manager to meet with university leadership at a professional level. Having senior consigliere support based on the successful institutional partnering kickoff, word

was spread within a broader network at the laboratory. Thus, a new not previously identified research and development senior mechanical engineer (consiglieri / kingpin) expressed interest in the pipeline initiative. The first touch network development began a ripple effect and this technical hiring manager was able to partner as well as travel to remote University for additional outreach, in the fall of 2019. The two partnering hiring manager engineers performed another off cycle recruiting event (competition divergence) which enabled personal as well as focused interaction with both students and department chairs. This developed a more robust set of relationship building opportunities. After just two strategic trips to the University, the senior lab representatives were able to gain agreements which brought the University President and his senior leadership team out to meet with laboratory senior leaders from across multiple stakeholder departments in January, 2020 just prior to COVID shutdowns. The new engineer advisory council role necessitated a ramp up of internal networking within a complex National laboratory to develop institutional leadership interface opportunities. By leveraging the previously mentioned partnering techniques, this technical hiring manager facilitated top echelon laboratory and university leadership collaboration well beyond normal management circles of influence. With the senior leadership teams gathered for introductory meetings, this technical hiring manager was able to further foster internal relationships with Bio Security, Weapons, Capital Projects, Environmental and senior leadership from this technical hiring managers department Associate Laboratory Directorate for Facilities and Operations. The Directorate issued a white paper in February, 2020 documenting goals to promote university outreach and partnership development strategy. Only three universities were identified in the strategy white paper and this hiring managers targeted University was highlighted for the first time as a new strategic partner resource pipeline focus due to the above mentioned outreach.

Unfortunately, due to the unforeseen COVID 19 pandemic shutdowns, long distance partnering development slowed dramatically. The early 2020 traction amongst institutional leadership was diverted to restructuring how to conduct business via remote telework. The inability to have boots on the ground to continue fostering relationships between institutions drew

out progress as we moved to intermittent virtual touches when time permitted while reconfiguring how to conduct business.

Contractual Trust

To ultimately begin working with new industry partners, TASED had to align several of the entities and their resources. Unlike peer technical hiring managers lacking outreach support awareness within the laboratory, see Figure 16 below, this hiring manager was able to advance a targeted university relationship with PPO support. Due to this hiring manager's relationship with University as a technical adviser on their engineering advisory council, the PPO immediately highlighted a need to eliminate any potential for perceived conflict of interest. Therefore, this technical hiring manager recused from any formal relationship development. Relationships developed within Steps one and two described previously were crucial, because those team members developed strategies independent of this hiring manager and were able to pick up the reins to continue fostering a more formal trust based relationship with University.
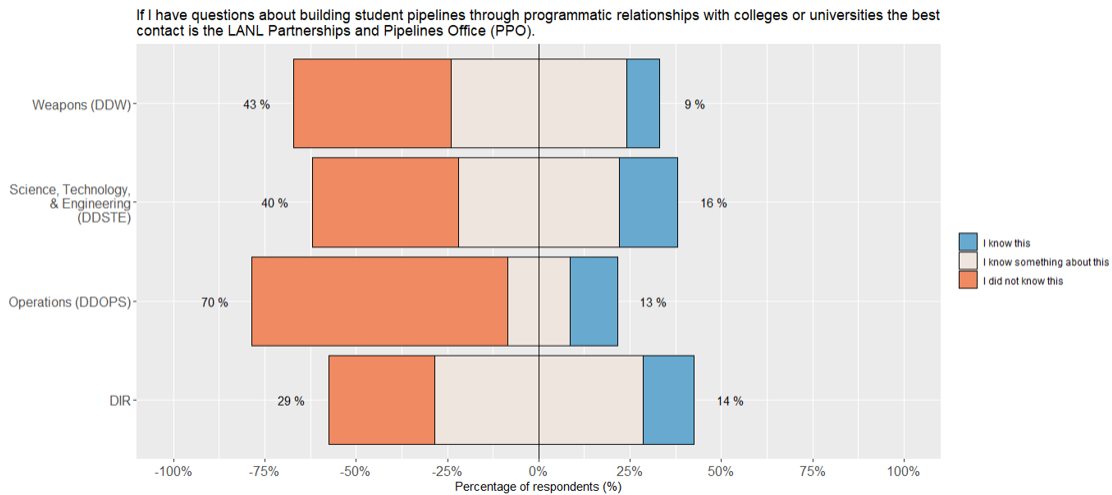

Figure 16 Lack of awareness (70% Ops) that PPO can assist with talent pipeline creation

Trust can also be considered an economic lubricant, reducing the cost of transactions between parties, enabling new forms of cooperation and generally furthering business prosperity (Schneider, 1996). Significant interest in considering trust as a form of social capital has led

research to a closer understanding of the creation process and distribution of such capital (Zak & Knack, 2001). Theoretical economical modelling demonstrated that the optimum level of trust an individual should exhibit in transactions is equal to trustworthiness of the other party. However, challenges to creating business trust during the new COVID telework virtual environment could be compared to the global economy's previous transition to online commerce (Braynov & Sandholm, 2002). Trusting less than appropriate leads to the loss of economic opportunities, while trusting more than appropriate leads to unnecessary vulnerabilities and potential exploitation. The level of correlation between an increase or decrease in transactional cost could correlate as economic value of trust indicators, as seen with positive and negative feedback on virtual commerce platforms (Resnick et al., 2006).

More formal relationship trust initiating documents are memorandum of understanding (Morgan & Hunt, 1994; Zheng et al., 2008). Due to LANL being a National laboratory the TASED team worked closely with PPO to ensure an MOU was non-binding and did not commit financial exchange. PPO helps hiring managers develop compliant pipeline relationships via MOUs, university contracts and student programs. Draft MOU and proposed research collaboration scope of work were classified as a lower priority during peak COVID while national laboratory business methods were restructured. Now that institutions have relearned new ways to conduct long distance business during COVID the University pipeline gained renewed focus due to a fall 2021 signed MOU memorializing an agreement to continue looking for innovation through shared technical competencies. Further the institutions have been collaborating during spring / summer / fall of 2022 to formulate a master task order agreement for execution during winter / spring of 2023.

Step #3, Divergence Strategy:

TASED could be leveraged by technical hiring managers to replicate the above mentioned process at targeted universities to foster young technical resource pipelines. Targeted universities should be evaluated not only for their specialty technical focus area of excellence, but

should also be for their ability to attract talent with similar extracurricular interests to ensure recruits are enduring due to an inherent culture fit. Our proximity challenge is finding technically sound individuals who fit our culture and are willing to live in or near the remote high alpine small town of Los Alamos, New Mexico. The next challenge is finding US citizens who can obtain and maintain the required clearance to support National security mission. To achieve a successful branding awareness amongst the university technical talent pool, LANL intends (post COVID 19) to maintain a frequent presence at the universities throughout the academic year. LANL should perform off cycle recruiting events, hold adjunct lecture roles and support technical discipline specific department consultant roles to advise on curriculum development. This active onsite presence should enable an opportunity for introductions to high performing talent early in their academic career. By developing relationships with technical students during their degree track and providing mentorship, the laboratory will rise to the top of their trusted employment opportunity list. As a result, the laboratory should achieve a competitive hiring edge against large private sector firms. Laboratory leadership is focused on a market advantage strategy to diverge from competition. By identifying aces earlier in their academic degree path LANL could begin to provide incentive to consider a National laboratory career early. Fostering relationships with a budding talent via student co-operative programs could give the laboratory a Blue Ocean Strategy advantage over the industry. LANL could develop partnering with young professionals and help them both technically and financially to finish their degree track. The co-op is a mutual benefit for both parties. The potential candidate can work at a National laboratory for an extended period and get to know the professional as well as extracurricular opportunities available in northern New Mexico. While at the same time, the laboratory management can evaluate an individual's work ethic and determine if there is a culture fit. Additionally embedded within partnership and pipeline office is the student services which is a relationship that can help to guide the process and establish the student mentoring program to ensure they have a positive experience while onsite at LANL. Once a mutual benefit is identified, an early offer package could be offered during a perspective talent's junior year. If offer is accepted the laboratory could start a clearance

process and potentially offer financial aid to support finishing the perspective hire's degree. By getting out ahead of the industry to solidify a candidate early the laboratory is able to break away from known reactive Red Ocean competition; thus, making them and the longer offer development process irrelevant. Currently the above mentioned strategy has captured approximately 6 highly qualified engineers and scientists whose relationship was cultivated over several years. Some interfaces started just prior to COVID and the opportunities fostered while existing in the COVID restrictive environment and returning to a more normal business conduct.

Part of trust building with a National security initiative includes Federal background investigation to ensure there is limited ability for mission compromise. This process could take years to achieve trust with the United States. Each step along the trust building process from a National security standpoint, effectively narrowing the field of available resource options. To ensure individuals and institutions are willing to deal with the hurdles in place technical hiring managers must constantly be working to foster and maintain critical relationships.

Finally, the team pulled enterprise human resource data for job postings only filling a single position to evaluate value add progress, see Figure 17 below. To avoid the data from being skewed by longer duration postings designated to fill multiple positions these data points were removed from the analysis. The general hiring trend reflects decreasing duration year to year. The initial hiring manager human resource survey was conducted in February of 2020 just prior to entering COVID shut down. The hiring trend ticked up slightly during the first year of laboratory shifting to telework. However by the end of 2020 the 60 day to hire pilot program had been conducted and findings socialized with stakeholder leadership. The enterprise improvements of 18% reduction in job posting to offer duration from fiscal year 2020 to 2021 can be attributed to the pilot program initiative. The slight increase in duration from fiscal year 2021 to 2022 is most likely attributed to a 19% increase in hiring offers issued by human resources, which did not have a corresponding increase of internal support staff numbers to effectively absorb the higher volume work load. Thus the focus tactics of assigning human resource generalist to

closely monitor each hiring process could not be replicated across the entire enterprise demand. Instead human resource focus was turned toward the unique to LANL technical positions which are extremely hard to fill due to their niche specialties; such as, roles like Accelerator Physicist, Nuclear hazardous Materials Technician, Mars Rover ChemCam Operations Specialist, Continuum Solid Mechanics Computational Scientist or Quantum Materials Systems Thrust Scientist. These unique highly specialized job positions tend to be very challenging to fill and subsequently cause the LANL job posting to offer timeframe averages to extend well beyond industry standards.

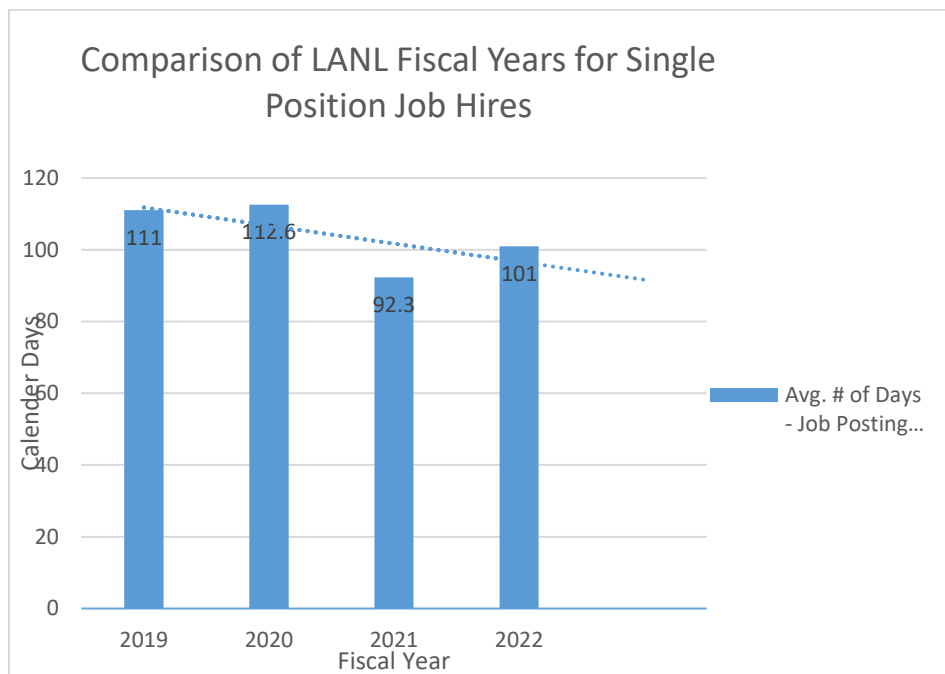*Figure 17 Comparison of LANL Fiscal Years for Single Position Job Hires*

Limits of the Study & Recommendations for Future Research

This research case study was applied across 119 divisions, programs and directorates at one DOE national laboratory institution. Survey data collection and industry outreach was formulated entering the unforeseen COVID pandemic. Majority of data collection was performed during the

COVID pandemic via remote surveys. Hypothesis as well as results need to be tested further now that market is beginning to normalize into a new norm post COVID isolation protocols. The case study should be expanded to other DOE and possibly DOD complex sites to test the hypothesis at other federal institutions and over multiple fiscal budget cycles to determine general applicability.

The next step recommendations are as follows;

- Identify other institutions and/or industry sectors to test the methods; such as, petroleum, academia, aerospace, medical and semi-conductor.

- Target an area with rapid mission growth demand and identify a proactive champion to test method and build partnerships / technique from scratch. The key is champion should gain senior leadership support prior to implementation so stakeholder engagement is streamlined.

CONCLUSION

Trust is not typically granted instantaneously, but rather it grows over an interval of time spanning multiple interfaces. The duration is dependent upon factors such as necessity, desire, and proactive follow-up. This technical hiring manager worked to open lines of communication with partnering representatives to proactively work on relationship building, so trust was established early to benefit future opportunity needs as they were identified.

Follow-up relationship building both institutionally as well as through industry outreach required patience to gain buy-in and to develop traction for various options. Based on interviews previous senior leadership experience developing talent acquisition outreach in the industry provided consensus the initiative could take a minimum of 2 years to establish a self-sufficient pipeline, excluding abnormal world influences such as COVID 19. Typically, it may take that long for individuals who enter and experience the process to then aid with spreading the word, promote awareness amongst peers and attract follow on talent. For the above-mentioned

process to be successful, this technical hiring manager developed a strategy and began implementing the TASED process leveraging modern business tactics. The first hurdle was developing trust among the National laboratory stakeholders as well as industry partners. Trust is a unique attribute essential to enable achieving a new initiative, mission or project objective. LANL has engaged in internecine battles (within the DOE/NNSA Complex and industry) for limited technical resources. LANL finds itself in immediate competition with large DoE needs for technical resources to execute the production mission at Savanah River Site in South Carolina, nearby Sandia National Laboratories in Albuquerque, New Mexico, as well as private sector entities like Facebook development in Los Lunas, New Mexico and INTEL in Rio Rancho, New Mexico. By choosing to leverage a private sector for-profit business model known as Blue Ocean Strategy, this technical hiring manager considers TASED set on a path toward providing incremental talent acquisition advancements within a complex National laboratory environment. The strategy develops bi-directional trust and a unique niche within the engineering and scientific talent acquisition market sector. Technical hiring managers must build trust with internal resources and industry partners, so that all entities are willing to conduct business for and with LANL in an expedited manner. The potential for full-scale implementation is real and pilot testing has proven concept. Candidates could be reluctant to work for a national laboratory that uses management systems to generate high throughput but that does not offer front-line empowerment to perform outreach so a professional STEM relationship can be fostered. Alternatively, the presence of misaligned practices may imply that management is not effective at recruiting creating a turnoff.

The Blue Ocean Strategy trust based partnership approach outlined enables focused solutions creating divergence from competition. Red and Blue Oceans have always co-existed. Practical reality requires us to succeed in both to maintain a competitive edge. Previous talent acquisition approaches were primarily competing in known Red Ocean strategies. The key moving forward could be an approach which makes the competition irrelevant. National laboratory leadership should consider focusing on formulating new collaboration and executing a

Blue Ocean Strategy as systematic as competing in Red Oceans of known talent acquisition space.

The TASED is currently in a forming phase with Associate Laboratory Directorate relationships. Follow-up outreach and relationship building institutionally as well as throughout industry will require patience to allow the process to develop traction, potentially a minimum of 2 years uninterrupted to become self-sufficient. To ensure success, the selected team of leaders should become a working group of experienced industry professionals who are motivated, who revel working through problems and have a king pin / consiglieri to help eliminate management hurdles, so a path toward success can be blazed. Four recommendations for next steps moving forward are: 1) Current lab talent hiring rates are just keeping pace with attrition rates; therefore, the ability to expand technical talent teams in the face of mission growth is an ever increasing problem. The hiring managers should partner with LANL's internal Lean Six Sigma team and perform a value stream analysis. This could highlight targeted areas of focus to help guide the process improvement initiative. 2) Create a process to track reasons for potential candidates declining an offer. These data points would be vital to help inform hiring managers and process improvement about possible frictions to avoid. 3) Technical hiring manager training program would aid to promote talent acquisition techniques for successful program implementation and should be a follow on value innovation. Training should highlight available internal services as well as soft skills pitch geared toward improving recruitment is a critical need. TASED stakeholders may need to commit a significant amount of preliminary effort and resources to establish a clear and executable baseline. 4) LANL should develop performance measures to evaluate the effectiveness of the laboratories hiring. Without improvements to Federal laboratory science and technology hiring strategy the US global standing could be at risk (Wright 2021).

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