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14. ABSTRACT
The Marine Corps faces an uncertain future due to threats and challenges to recruiting the future of the force. Economic growth, decreasing propensity of youth to serve in the military, and insufficient quality factors indicate that the Marine Corps is entering a challenging new era regarding recruitment. The Marine Corps' method of recruiting, systematic recruiting, is sound. However, the method is being limited by outdated systems and technology. Since the implementation of systematic recruiting, the only significant advances to the process have been attempts to automate the system through the implementation of Marine Corps Recruiting Information Support System (MCRISS).

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FUTURE WAR PAPER

Empowering Our Recruiters: Leveraging Narrow Artificial Intelligence and Cloud-based Customer Relationship Management Tools to Enhance Systematic Recruiting

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF OPERATIONAL STUDIES

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Introduction

The Marine Corps faces an uncertain future due to threats and challenges to recruiting the future of the force. Economic growth, decreasing propensity of youth to serve in the military, and insufficient quality factors indicate that the Marine Corps is entering a challenging new era regarding recruitment.[1] [2] The Marine Corps' method of recruiting, systematic recruiting, is sound. However, the method is being limited by outdated systems and technology. Since the implementation of systematic recruiting, the only significant advances to the process have been attempts to automate the system through the implementation of Marine Corps Recruiting Information Support System (MCRISS).

In business models, it is imperative to differentiate between the method and the supporting system. Marine Corps recruiters often fail to differentiate between the method of systematic recruiting and MCRISS as the supporting information system. To help illustrate the difference, think of the history of road navigation. The method of navigation is simple: 1) determine current location, 2) identify the destination, 3) determine the route, and 4) execute. Technology has not fundamentally changed this method, but it enables efficiencies in the process. Computers enabled the transition of paper maps to online maps. Online maps, combined with GPS navigation devices, enabled access to maps and directions in a vehicle. Now, mobile map applications like Waze and Google enable real-time traffic, route updates, and speed trap locations. The technology that enables this is a series of artificial intelligence algorithms being fed socially-sourced meta-data from drivers.[3] The method of navigation did not change; however, the application of narrow artificial intelligence has radically altered the efficiency and effectiveness of the method.

When systematic recruiting was first implemented, it was similar to navigating with a paper map. All records were maintained on paper, and statistical computations were conducted by hand. The implementation of MCRISS was like advancing to computer-based maps. MCRISS increased efficiencies in deriving statistical calculations and automated some of the record keeping, but it falls short and the recruiter pays the price with time. The lost time of a recruiter transfers to reduced quality time each recruiter has with prospective applicants and poolees. If the Marine Corps fails to adapt and integrate new technologies to support systematic recruiting, the institution risks failure in recruiting the future force. The application of narrow artificial intelligence and a cloud-based Customer Relationship Management (CRM) platform enables opportunities to increase propensity and the acquisition of high-quality human-capital, decrease attrition, and enhance the Marine Corps' recruiting and personnel management system.

Problem Framing:

The Marine Corps' success on recruiting over the last decade is the unstable foundation of the Marine Corps' central problem. In comparison to the other services, the Marine Corps has enjoyed relative success in recruiting talented young men and women into the service. In January 2018, General Jurney (Commanding General for Western Recruiting Region/Marine Corps Recruit Depot San Diego) stated: "This past year we had historical success, which exceeded the last 10 years, since 2008, in finding and selecting above and beyond what we were actually looking for."[4] The Marine Corps' success on recruiting causes leaders to defend and justify the status quo regarding the current systems and programs, and results in the failure to modernize personnel policies and systems.[5] Additionally, this success has been assessed through faulty

metrics that fail to determine if the institution is truly recruiting high-quality human capital. The Marine Corps has been blinded by success and is at risk of mission failure on recruiting.

People constitute the fleshy heart of the United States Marine Corps. Without them, the Marine Corps is simply a block in a line diagram on the Department of Defense (DOD) table of organization.[6] Recruitment and training of quality people are critical to maintaining the fleshy heart and sustaining the force. To sustain the current force of approximately 184,000 Marines, the Corps needs to ship approximately 30,000 recruits to recruit training each year.[7] General Neller identified recruitment and manpower management as a critical task in the 2016 Marine Operating Concept. In addition to identifying the Marine Corps as a "personnel-centric military organization…", he states, "…we must modernize our personnel policies to improve access to high-quality human capital…"[8] The Marine Corps' desire for high-quality human capital is being challenged by three primary changes in the operating environment.

Economic growth, decreasing propensity to serve, and insufficient quality assessments are emerging challenges for military recruitment across the Department of Defense. Joint Advertising Marketing Research and Studies (JAMRS) supports military recruitment for the Department of Defense through marketing, communications, and market research studies. For decades JAMRS has tracked and analyzed factors that impact military recruitment. In 2017, JAMRS identified several disturbing trends in the Spring 2017 Propensity Update.

> **Economic growth**: Since 2010, the proportion of the youth (defined by JAMRS as 16-21) who believe individuals are more likely to have a good-paying job in the military than in the civilian sector has trended downward. This is not a slight decrease – it dropped from 23 percent in 2010 to 13 percent in 2017 (see Figure 1).[9] The disbelief in the military as a viable economic opportunity, coupled with the lowest national

unemployment rate since 2007, is negatively impacting the propensity of quality youth to join the military.

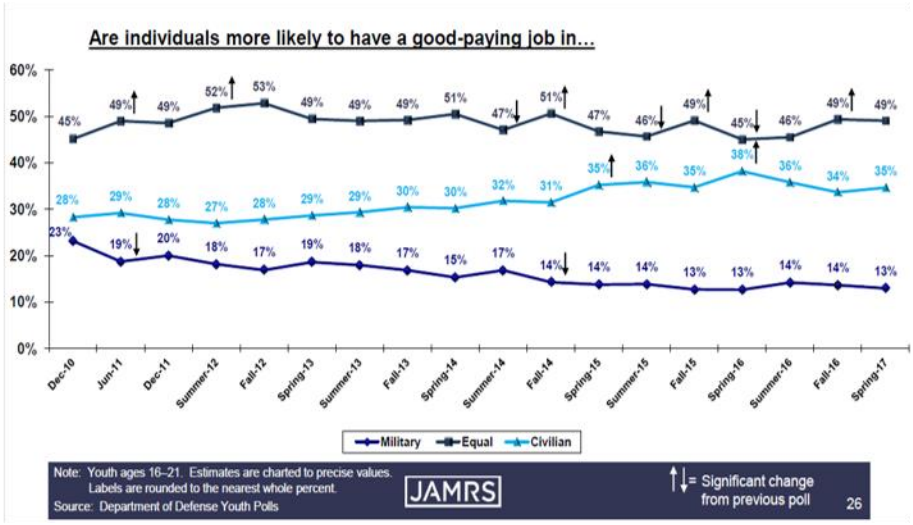


Figure 1: Perception of Economic Opportunity in the Military

Propensity: On the surface, propensity for military service has remained relatively stable at 14 percent for youth ages 16-21 (non-service specific). However, this stability has come at a cost of quality and certainly does not reflect General Neller's desire for "high-quality human capital." This stability in propensity has been bolstered by a 50 percent increase in propensity by lower academic quality White and Hispanic youth over a two-year period (see Figures 2 and 3).[10]

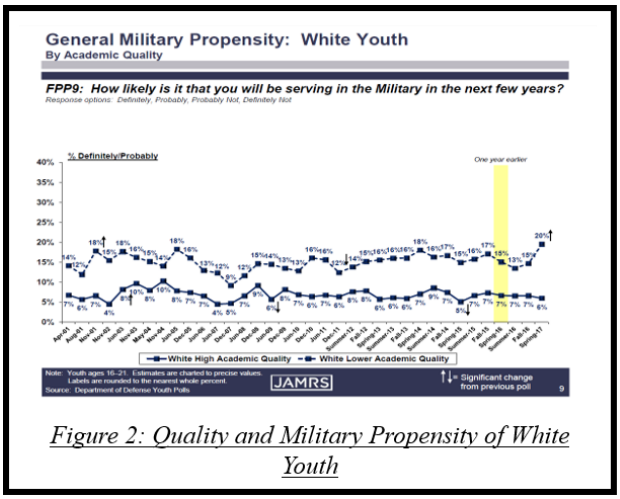


Figure 2: Quality and Military Propensity of White Youth

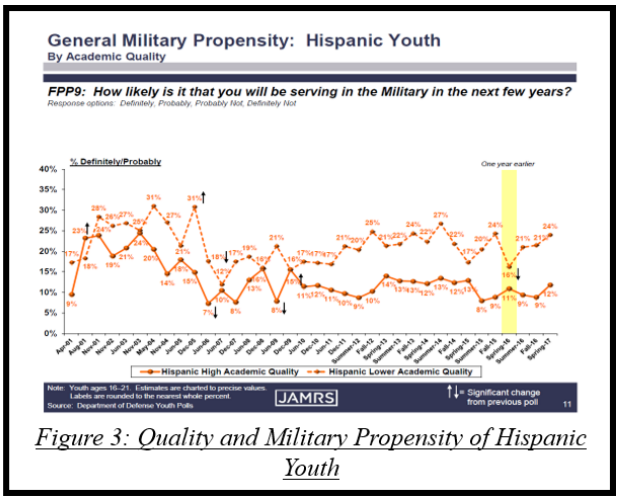


Figure 3: Quality and Military Propensity of Hispanic Youth

The decline in youth propensity is more troublesome when the study is narrowed to propensity specifically for the Marine Corps. Youth propensity to join the Marine Corps is at a historic low – 6 percent (comparative high was 10 percent in November 2003). This is the lowest documented propensity since April 2001. Additionally, during a time that the Marine Corps is focusing on increasing gender diversity, female youth propensity is at 2 percent (comparative high was 5 percent in the fall of 2014).[11] Finally, youth knowledge of the military is rapidly declining due to a declining veteran population and lack of recruiter contact. For example, in 1995, 37% of youth had fathers who had served in the military. As of December 2010, this had dropped to 16% of youth.[12] This decline in the veteran population is noteworthy because veterans in the family have historically had a strong, positive influence on propensity to serve. Exacerbating the declining knowledge of the military is the decrease in recruiter contact from 62 percent in 2002 to 36 percent in 2017 (see Figure 4).[13] Declining influencers in the family, coupled with decreased contact with recruiters, have both contributed to the declining propensity in the high-quality target market.

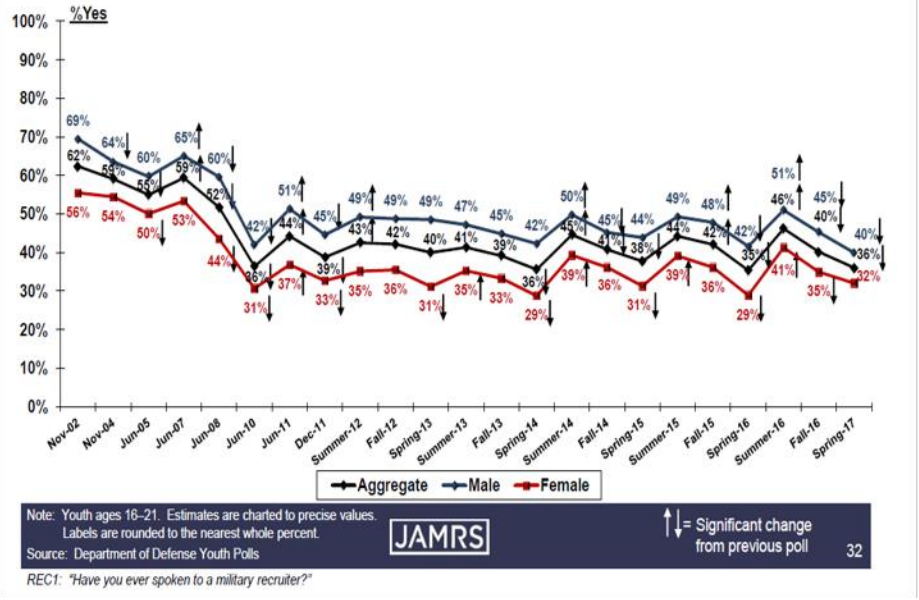
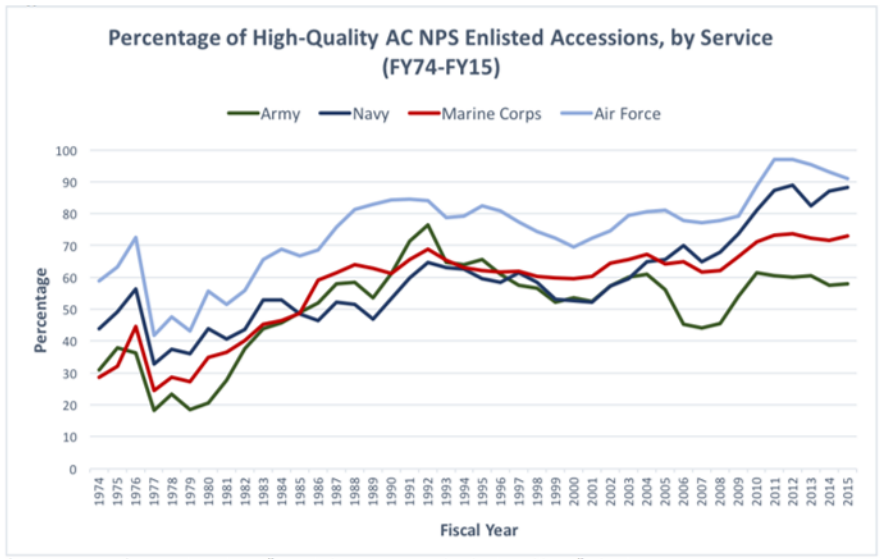


Figure 4: Recruiter Contact with Target Population

Quality: 75 percent of age qualified youth are unqualified for military service due to medical, moral, or educational issues.[14] Despite this challenge to the target market, quality is seemingly increasing in the Marine Corps. Since 2008, the Marine Corps has increased the accession of high-quality applicants (see Figure 5).[15] However, this metric is misleading and overly simplistic. A recruit is defined as high quality if an applicant has a Tier 1 education credential (high school diploma) and scores in the 50th percentile or above on the Armed Forces Quality Test (AFQT). As 99 percent of accessions had Tier 1 educational credentials, the main determinate of quality is the AFQT score. As the sole indicator of quality, the AFQT is simplistic and does not reveal the true quality or future performance potential of applicants in the diverse educational environment of today.



Source: Center for Naval Analyses, "Population Representation in the Military," Fiscal Year 2015, 17. https://www.cna.org/pop-rep/2015/summary/summary.pdf

Figure 5: Percentage of High Quality Accessions by Military Service

Narrow Artificial Intelligence (AI): What Is It?

The application of AI to systematic recruiting offers distinct opportunities to increase propensity, redefine quality, and give Marine Corps recruiters an advantage in the competitive market. Prior to exploring specific applications of narrow AI to enhance systematic recruiting, it is important to define several words. A broad definition of AI is "the replication of human analytical and/or decision-making capabilities."[16] AI is further broken down into general AI and narrow AI. General AI refers to AI that is capable of handling any generalized task which is asked of it. At this juncture, general AI remains a theory and a focus for future development. This paper will address the application of narrow AI. Narrow AI is designed to handle a specific task or set of tasks that have been previously defined by the programmer. Within narrow AI there are several different disciplines and components that feed into the application of narrow AI. The most familiar of these disciplines is machine learning.

Machine learning (ML) is a discipline of AI that uses data to learn and better understand the world and subsequently develop recommendations through the use of predictions. Predictive analytics, or the process of using data to create predictive models that forecast the desired outcome, has been around long before narrow AI.[17] However, narrow AI enables the processing of massive amounts of data in seconds in comparison to what previously took a person months or years to process.

There are five key components that drive most narrow AI applications, or machine learning systems: data input, data processing, predictive models, decision rules, and outputs.[18] Once each component is defined, two examples will be provided regarding how these components can be applied to enhance systematic recruiting.

Data Input: Data is the fuel for creating predictive models. This data can come from pre-existing databases, pre-processed data (exams), social media, cameras, and photos. This list is not exhaustive as data sourcing is near limitless due to the processing capacity of narrow AI.

Data (pre)processing: This is the processing of raw data into defined categories. In the past, this required a human to categorize each data point. Narrow AI automates this step and pre-processes raw data into specified categories.

Predictive models: Utilizing the pre-processed data, the system creates predictive models. Each model is designed to maximize a desired characteristic or outcome. These models are continuously refined with the input of new data and desired characteristics.

Decision rules: Once a prediction is made, a decision is required regarding what action or inaction to take. Here, the rules can cause the system to take follow-on action, or it can be passed off to a human for a decision.

Response/output: Finally, action or inaction must be taken. Once again, this can be an automated response by the narrow AI application, or it can be an action passed off to a human.

How Can Narrow Artificial Intelligence Enhance Recruiting in The Marine Corps?

The application of narrow AI to enhance systematic recruiting in the Marine Corps will enable new opportunities to increase the propensity of high-quality human capital through focused sales efforts and enhanced quality assessments. The Enlisted Recruiting Process (ERP) consists of the following eight steps: obtaining names, prospecting, screening, selling, processing, pool program, shipping, and command recruiting (see Figure 6).[19]

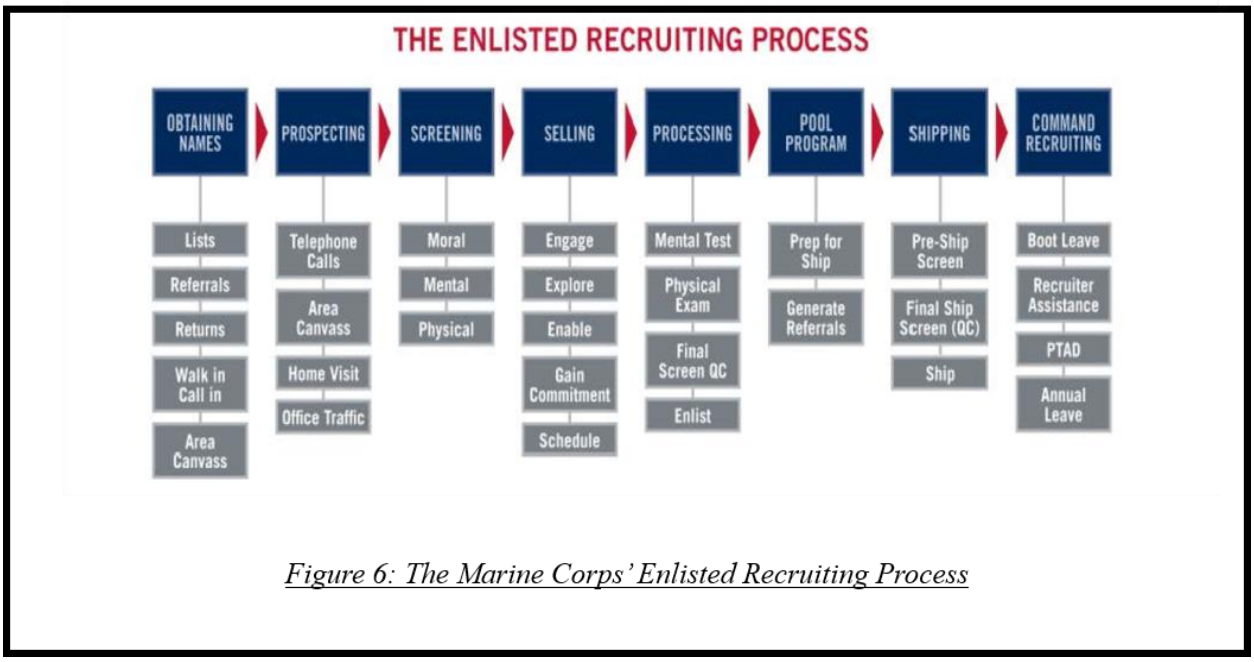


Figure 6: The Marine Corps' Enlisted Recruiting Process

Not all problems can be solved through the application of narrow AI; it requires a specific problem to be solved and the data required to fuel the machine learning process. Additionally, some tasks are better suited for narrow AI while others are better suited for human

interaction. For example, within the ERP, selling and the pool program are dominated by human interaction and interface – nothing can replace a Marine recruiter sitting down with an applicant for an interview. While there are opportunities for narrow AI to impact each of these steps, this paper will focus on obtaining names, prospecting, screening, and processing (see Figure 7). In these four steps, narrow AI has the potential to exponentially increase efficiency and enable the recruiter to spend more time selling and working the pool program.

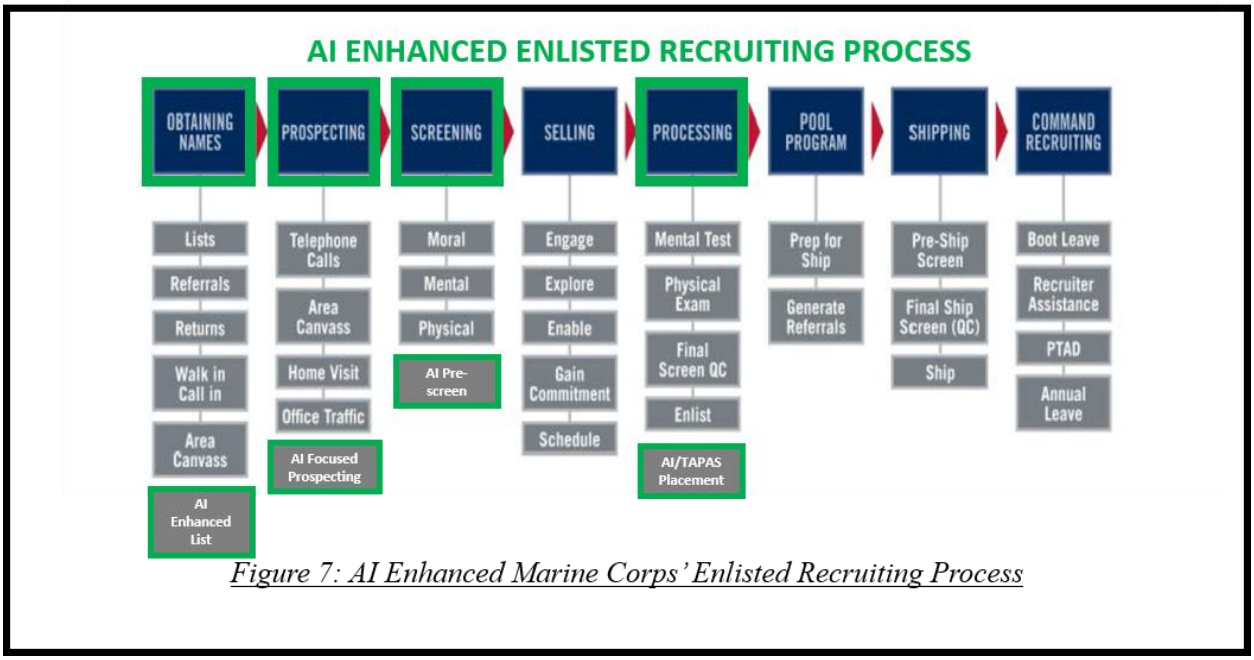


Figure 7: AI Enhanced Marine Corps' Enlisted Recruiting Process

Example 1: Enhancing Steps 1-3

Recruiters spend the preponderance of their productive time each month obtaining names, prospecting, and screening.[20] Within these steps, the application of narrow AI could save the individual recruiter an estimated 40-50 hours per month that could be reallocated to selling and managing the pool program. Utilizing the five components of machine learning discussed above,

the following is an example of how narrow AI can enhance obtaining names, prospecting, and screening.

Data Input: The primary source of data input will remain the lists of names from high schools. At no additional cost, narrow AI can enhance these lists with the pull of all public social media profiles within a determined geographic area, and social network mapping of current Marines and poolees. These two actions will rapidly expand the depth of prospective applicants and save time for recruiters.

Data (pre)processing: From this enhanced list of names, several additional pieces of data can be defined and assessed at no cost. Categories for assessment could include URL and web search history, social media likes, police records, and the estimated height/weight of prospective applicants through photo analysis. This data processing enables prioritization and pre-screening of the lists prior to contact of the prospective applicant with the recruiter.

Predictive models: Utilizing data from current Marines, predictive models are established. For example, historically an 18-24 year-old that is involved in at least one competitive sport and demonstrates an inclination for adventure usually makes a good Marine. Conversely, an obese 18-24 year-old that has never participated in a team sport usually does not make a good Marine. These predictive models are applied to the list of names and assigns a numerical score or value to each name.

Decision rules: Once these scores are assigned from the predictive models, rules are established. For example, anyone with a permanently disqualifying factor that resulted in a zeroed out numerical score is automatically scrubbed from the list – the recruiter is saved the time from ever attempting to contact this prospective applicant. Those in the top 10 percent are flagged for priority contact by the recruiter. Additionally, middle

scores trigger an automatically targeted mailout and social media advertising campaign to educate and inform the applicant prior to initial contact.

Response/output: Based on the established rules, recruiters now have a prioritized list of prospective applicants with a projected higher propensity. Gone are the days of blindly calling a list – recruiters have significantly increased the chance of getting the right person in the office to interview in less time. This additional time can be focused on preparation for selling during the interview and quality time reinforcing the sale within the pool program.

Example 2: Enhancing Step 5 (Processing) and Redefining Quality

The application of narrow AI during processing will redefine quality and ensure the Marine Corps is selecting the best job for applicants. Under current practice, recruiters and recruiting station leadership must manually assess which jobs are available to each applicant based on the score of the AFQT and the results of the physical. Outside of the AFQT score and any physical limitations, no formal assessment is used to determine the best job for an applicant. Marine Corps applicants are currently taking the Tailored Adaptive Personality Assessment System (TAPAS) test during processing to assess non-cognitive aspects of each applicant. This test, accompanied by the AFQT and the results of the physical, are ideal data inputs for the subsequent job processing and placement of an applicant. Once again, utilizing the five components of machine learning discussed above, the following is an example of how narrow AI can refine and improve processing.

Data Input: Data input will come primarily from current Marines and the scores of the applicants as they process (ASVAB, TAPAS, and physical).

Data (pre)processing: The integration of TAPAS enables a wealth of additional information regarding personality and likelihood of success in a specific MOS or job. There is a rich data source compiled by the developer of the TAPAS test that already indicates specific categories that affect performance in different military jobs. Additionally, the availability of jobs and shipping requirements of a recruiting station can serve as additional processing categories.

Predictive models: With the input of an applicant's ASVAB, TAPAS, physical results, and availability of jobs, a predictive model will automatically generate the recommended jobs for an individual applicant, along with pre-developed decision trees that will aid the recruiter in discussion with the applicant.

Decision rules: From the model, decision rules are developed. These will include any absolute restrictions (ex – an applicant cannot be motor transport due to vision limitations), and automatically prepare the required paperwork to continue processing the applicant.

Response/output: Finally, the output or response requires the interaction of the recruiter with the applicant. This final step resembles what occurs on a daily basis now, but it is augmented with an informed and intelligent set of recommendations that will ensure the continued acquisition and placement of high-quality human capital.

Summary of How Narrow AI Will Enhance Systematic Recruiting

Combining a recruiter's personal interaction with a machine's ability to recognize patterns and quickly assess applicant viability will fundamentally change the efficiency of a recruiter. As recruiters gain efficiencies, time and focus can divert to the selling step of the ERP and training time with poolees prior to shipping to recruit training. The automation of the process will also enhance market awareness and thereby increase propensity. The reallocation of time to selling and pool engagement will decrease attrition both within the delayed entry program and at recruit training. Narrow AI, partnered with human interaction, is the key enabling technology to modernize the personnel policies and programs (see Figure 8).[21] However, the application(s) of narrow AI must be integrated with a platform to maximize prediction capability and decision-making power.

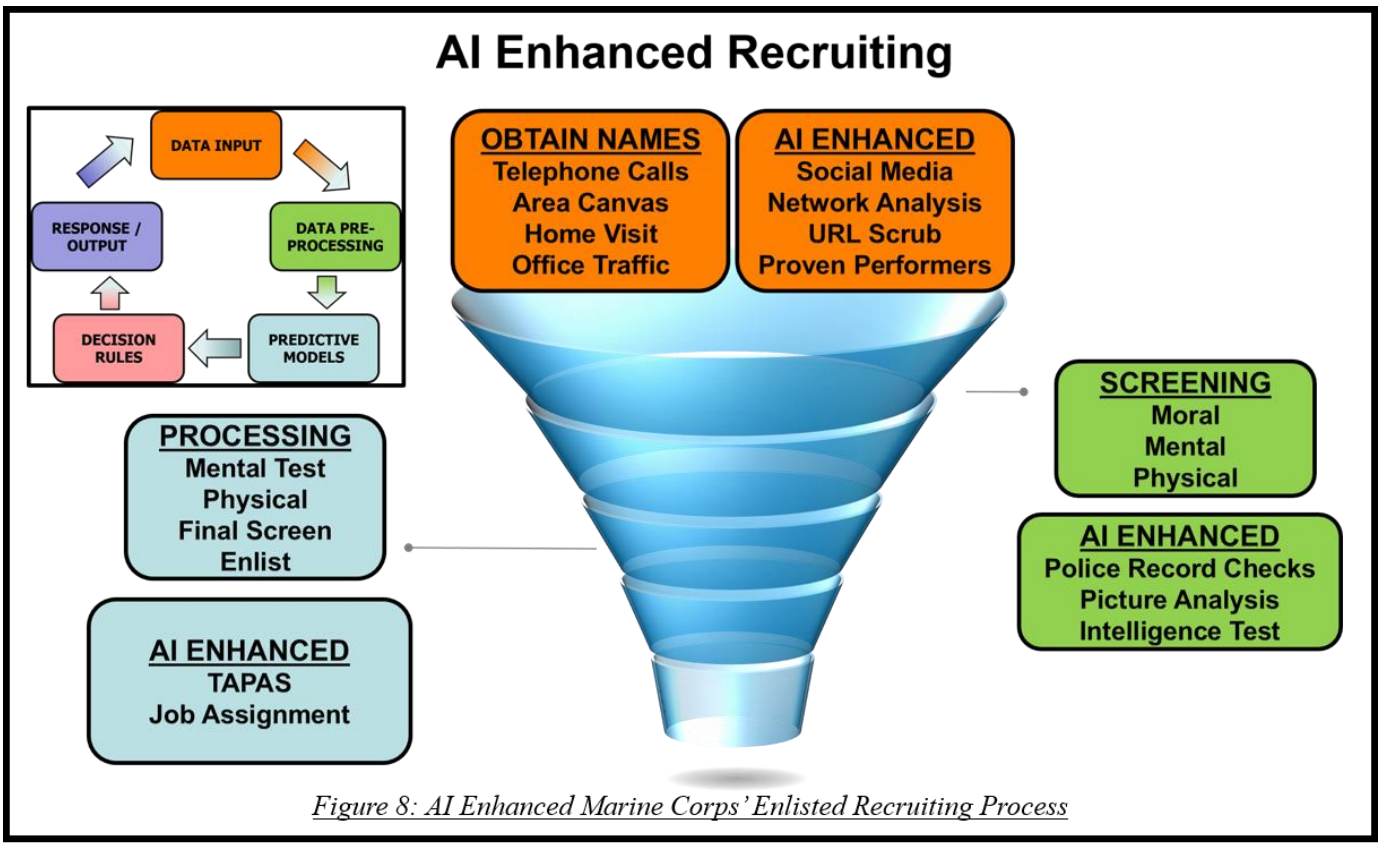


Figure 8: AI Enhanced Marine Corps' Enlisted Recruiting Process

Cloud-based Customer Relationship Management (CRM) Solutions: How to Exploit Narrow AI in Recruiting

The application of narrow AI in support of recruiting requires a cloud-based Customer Relationship Management (CRM) solution to remain agile and adaptive to emerging technologies. CRM solutions enable an organization to store and manage prospect and customer information in one location; it enables an increase in leads, shortens the sales chain, and increases customer loyalty and satisfaction. To maximize the impact of the predictions and outputs of narrow AI in recruiting, cloud-based CRM is required to manage and enable the decision-making of recruiters and leadership. As previously discussed, the current information management system that the Marine Corps utilizes is MCRISS. As an information system, this database is static and simply provides a database of information. While it can perform simple analysis and calculations it has several deficiencies. These deficiencies include the inability to integrate with other programs and applications, server-based (security risks and lack of flexibility), and inability to effectively synergize sales and marketing efforts.[22]

A cloud-based CRM will enhance security and allow for the integration of other emerging applications and technologies. Cloud-based applications are inherently more secure and adaptive to the emergence of new technology. Cloud-based applications enable flexibility and agility by enabling the real-time integration of updates and changes to the program.[23] Additionally, the built-in redundancy in cloud-based applications prevents the physical shut-down of the server due to the physical concern of the server. This flexibility will enable the integration of updated and emerging narrow AI applications, data-fields (updating what MCRC wants to track), and security updates.

The sustained use of narrow AI will continue to refine the data input in the machine learning process thereby continuously enhancing quality metrics and the job selection process.

Narrow AI is reliant upon a rich source of initial data input. This can be pulled from current Marines, but may not possess all the required data points to make the best recommendations. The sustained use of a cloud-based CRM will enable this data to be managed, and as those applicants begin their service in the Marine Corps their performance is tracked and evaluated. This maturation of the data input will continuously enhance the predictions and recommendations of the machine learning algorithm. As quality is continuously being redefined, the recruiters can increasingly target their efforts on contact with the most desirable applicants.

The application of narrow AI through a cloud-based CRM will also enhance sales and marketing efforts through targeted advertisements and engagement. Sales and marketing in the Marine Corps are managed at two levels: strategic and tactical. At the strategic level, it is managed and executed by J. Walter Thompson (JWT). The Marine Corps has relied upon JWT to provide strategic advertising and marketing to the Marine Corps for over 70 years.[24] For strategic engagement, JWT remains a powerful partner. However, at the tactical level (recruiting station and below), JWT falls short of expectations.[25] Due to restrictions in the contract with the Marine Corps, JWT has imposed local advertising and marketing restrictions to ensure they receive credit for all lead generations.

The tactical level is managed and executed at the recruiting station level with support from the district. This consists of local advertising and marketing campaigns, participation in local community events, and utilization of social media. These local efforts rely primarily on the intellect and ingenuity of individual recruiters and leadership. Success is usually cyclic and dependent upon the experience of a recruiter. This proficiency is subsequently lost when that recruiter returns to the operating forces. Additionally, in comparison to competitors in the civilian job market, these efforts lack the integration of professional resources and insights that can be achieved through narrow AI analytics. The application of narrow AI enables targeted

advertising and marketing to the desired customer. Anyone who utilizes Amazon to purchase products can attest to the eerie ability of Amazon to predict what products they need or want. This is the power of the application of narrow AI and a cloud-based CRM. Integrating sales and marketing in the same cloud-based CRM platform that recruiters are using will enable shortened sales chains, increased production, and a more enjoyable journey through the entire process for the applicants and their families.

Impact of Narrow AI and Cloud-Based CRM on Manpower Management

Implementation of narrow AI applications and a cloud-based CRM solution in recruitment has a secondary effect in manpower management. There is a symbiotic relationship between recruiting and manpower management. The same data that feeds the machine learning algorithm to focus a recruiter's effort can be used to determine the best assignment for a career Marine. Subsequently, that Marine's success or failure in the next assignment feeds the initial input in redefining quality and making the best predictions for future applicants. The Marine Corps' primary manpower management tool, Marine Corps Total Force System (MCTFS), would benefit from integration into the same cloud-based CRM being proposed for recruiting. Benefits would include continuity of personal information, refined and richer data inputs that lead to better predictions, and manpower/talent management predictions fueled by narrow AI.

Finally, should the Marine Corps need to conduct a wartime mobilization effort, narrow AI and a universal CRM in support of recruiting and manpower would enhance the assignment of personnel to maximize the assignment of the right person to the right job. If deemed necessary, this would support the integration of civilians into senior staff non-commissioned officer and officer assignments based upon their personalities and civilian job skills.

Limitations and Considerations

AI and emerging technologies are not panaceas. The successful implementation of narrow AI solutions requires leadership to consider the ethics and legality for the use of data, the cost, and the limitations. The scope of this paper does not permit a detailed analysis of these issues; however, each will be briefly discussed and the subjects identified for further investigation.

Ethics and legality: As previously discussed, narrow AI and machine learning algorithms require massive amounts of data to enable the best predictions and successfully enable decision-making. In the United States, this personal data is available to be harvested and used to focus recruiters' efforts. As legislation regarding publicly available information is implemented, the Marine Corps will need to adapt the methods, techniques, and filters to ensure compliance with current legislation.

Costs: A common deterrent from implementing new technology is the initial cost. However, companies ranging from healthcare to consumer goods, have consistently demonstrated the cost-savings and return on investment that the application of narrow AI can achieve.[26] In the majority of the case studies that Daugherty and Wilson discuss in *Human + Machine: Reimagining Work in the Age of AI*, companies beat projected return on investment dates.

Limitations: The application of narrow AI will not directly impact some of the challenges discussed in the problem framing section. For example, narrow AI will not directly impact the effect that the economy has on youth propensity. However, insights gained through the application of narrow AI, with a revised advertising and marketing strategy, enables an alternative avenue to educate and expose prospective applicants to the benefits of the military. Additionally, narrow AI is only as good as the data that feeds the machine learning. If the

availability of this data is diminished, so will the impact that the application of narrow AI will have on recruiting. Finally, the decision to implement these solutions will require senior leadership to take risks in acquiring new technology and platforms, and potentially modify relationships with current partners such as J. Walter Thompson.

Conclusion and Recommendations

In conclusion, the Marine Corps' is at risk of losing its competitive edge in recruiting. Economic growth, decreasing propensity of youth to serve, and insufficient quality factors imperil the continued success of recruiting in the Marine Corps. The foundation of systematic recruiting remains relevant and valid. Through the implementation of narrow AI solutions, supported by a cloud-based CRM, the Marine Corps can continue to ensure future success. Two specific recommendations for further development and implementation: 1) determine where the application of narrow AI is most impactful, and 2) identify and implement a cloud-based CRM that meets the needs of recruiting and manpower management.

Where is narrow AI most impactful? Dr. Steven Finley, a data scientist with over 20 years of in developing machine learning-based solutions identifies ten critical questions to ensure that the problem would benefit from a machine learning or narrow AI application (see figure 9).[27] MCRC, along with a data scientist, must break down each step of the ERP and prioritize where narrow AI would be the most impactful. The application of narrow AI will give valuable time back to the recruiter to increase personal interaction with prospective applicants and poolees. The personal interaction between a recruiter and an applicant remains the most powerful and enduring tool in recruiting and retaining quality personnel.

Critical Questions to Assess AI Opportunities

1) What is the business problem?
2) What metric do you wish to optimize?
3) What type of decision rules and actions will you apply?
4) Where will the data to do the machine learning come from?
5) How will you operationalize the machine learning process?
6) What are the ethical and legal risks associated with automation?
7) Is all required data available operationally?
8) Is the solution being implemented in an active or passive way?
9) How will you assess the success of the project?
10) What are the on-going costs of maintaining the system?

Figure 9: Assessing the Opportunities For Integrating Narrow AI in a Business

What is needed for a cloud-based CRM to truly exploit the application of narrow AI and enhance systematic recruiting? A cloud-based CRM must possess the following features: narrow AI-based analytics and prediction capable, integrated advertising and marketing platforms, email/social media and calendar integration, mobile accessible, dynamic data importing, and real-time updating. As discussed in the considerations and limitations, the initial acquisition and development cost will be high, however, the long-term impact and return on investment are worth the initial cost. Additionally, with the integration of advertising and marketing, the Marine Corps may find cost savings in reducing its advertising contract with JWT.

The Army missed its recruiting goals for the fiscal year 2018. Few things cause institutional change more than mission failure. Seeking success, the Army will aggressively seek out the integration of narrow AI to gain a positional advantage over the other services. Paul Daugherty and James Wilson, who lead the AI initiatives group for Accenture, stated, “The AI revolution is not coming; it is already here, and it is about reimagining your processes, across all functions of the company, to get the most benefit from this technology’s power to augment

human capability."[28] Will the Marine Corps wait until mission failure, or will the Marine Corps innovate and enhance systematic recruiting prior to catastrophe?

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