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A Review of U.S. Army Non-Materiel Capability-Development Processes

KEY FINDINGS

Across the doctrine, organization, training, leadership and education, personnel, facilities, and policy (DOTLPF-P) domains, the U.S. Army has, and follows, formal processes to make changes in each, and the Army appears to use all these processes frequently.[a] Although the Army is currently making significant changes to these processes, many aspects of its current approach appear to be successful. However, there are issues to keep in mind when making changes in some domains, including the following:

■ Doctrine and policy are changed frequently, and these changes follow the guidelines for creation and revision dictated by Headquarters, Department of the Army (HQDA), as well as U.S. Army Training and Doctrine Command (TRADOC) guidance and regulations. Primary mechanisms that help ensure success are funding, prioritization, and comment resolution.

■ In the organization domain, any issues that arise throughout the process are typically related to disagreements over prioritization or a failure to appropriately resource the organizational change.

■ In the leadership and education domain, the most significant hurdle is that changes typically require substantial lead times for development and implementation.

■ In the facilities domain, challenges can arise because changes often lag those made in the other DOTLPF-P domains.

Our results converge on three factors that should be considered as *necessary*, but not *sufficient*, conditions for improving the likelihood of success of a solution or change:[b]

■ Initial and continued *senior-leader interest and support* can enable the implementation and success of a solution, particularly support from the Chief of Staff of the Army or Vice Chief of Staff of the Army for cross-proponent cases. However, strategic objectives and operational demands can change a leader's priorities.

■ *Rapid institutionalization* allows for a solution to "hit the streets" relatively quickly and become part of the broader Army (both organizationally and culturally).[c] Once adopted and employed, a change or solution—especially if its utility is continually demonstrated—becomes more enduring.

■ Demonstrated *operational utility* provides a rationale for a solution or change to be resourced and amended (as warranted) because it meets deployed-unit needs. If the operational environment changes, the solution must continue to show both utility and adaptability, preferably across a range of environments and under varying conditions.

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[a] This report focuses primarily on the quantity of changes, as opposed to quality. We never attempted to judge the quality of a given solution; that level of analysis was beyond the scope of this project.

[b] We did not define *success* as whether a program endured but instead whether it met its initial objectives. All successful case studies reviewed had these three factors. We recognize that we did not examine every historical case across all domains and that we evaluated only cases of success. We are unable to say whether these three factors existed in unsuccessful cases, as we had very few, if any, examples of failed solutions. The notable "failures" included the Crusader (advance artillery system), the Comanche (vertical lift), Future Combat Systems, and the Ground Combat Vehicle. However, these were all materiel solutions, which were not a focus of this report.

[c] Although there is no quantitative way of defining *rapid* in this context, we consider *rapid institutionalization* to mean that as many different domains as possible were working in parallel to field the solution as quickly as possible.

Overview

TRADOC requested that RAND Arroyo Center conduct an independent review of the DOTLPF-P capability-development processes. The purpose of the project was to identify issues and develop recommendations to improve the implementation of non-materiel solutions that have the potential to mitigate Army capability gaps. Note that this analysis did not assess the materiel capability-development process.

Because the DOTLPF-P processes cross multiple four-star commands and both the Army staff and secretariat, it is critical that all senior leaders and their staffs have a common view on the strengths and weaknesses of the capability-development process. We found that, other than the facilities domain, the subprocesses of DOTLPF-P work well, as shown in Table 1.

TABLE 1

Summary of DOTLPF-P Findings

Doctrine and Policy	Organization	Training	Leadership and Education	Personnel	Facilities
There is a dynamic process with frequent changes In the past eight years, 50 percent of doctrine has been revised The process appears to be formal, followed, and effective	Proponents can develop and propose changes For example, Stryker Brigade Combat Teams (SBCTs) in 2010 had 106 subunits; after numerous changes in six years, there were 137 subunits total in 2016 Large-scale changes are driven by senior leadership Small-scale changes happen frequently	Training occurs across all parts of the Army Centers of Excellence did not highlight any desired training that was not resourced	Many avenues are available to amend and address leadership priorities For example, two avenues are the creation of the Institute for Noncommissioned Officer Professional Development and the merger of the Center for Army Leadership and the Center for the Army Profession and Ethic (CAPE) The domain is responsive to changes in Army needs and requirements	Changes are feasible within proponent Cross-proponent changes are difficult From fiscal years (FYs) 2014 to 2018, there were 453 personnel coding actions Cross-proponent changes likely require HQDA-level intervention	The current focus is on improving existing facilities, but there are many ways in which materiel and other DOTLPF-P changes can create new facilities requirement Changes may outpace facility investment Large-scale changes could exacerbate these challenges

Institutional Army Context

The Army is undertaking a significant reform to change the way it will fight in future wars. In TRADOC Pamphlet 525-3-1, *The U.S. Army in Multi-Domain Operations 2028*,[1] the Army identifies several factors compelling this reform. At the heart of this reform is a significant modernization enterprise, captured in *2019 Army Modernization Strategy: Investing in the Future*.[2] In that document, the Army highlights the fact that modernization is focused on more than just materiel solutions. The Army describes modernization as changing "how we fight, what we fight with, and who we are."[3] The Army's modernization framework explicitly includes all the domains: doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPF-P). The reform consists of numerous changes to the combat-development enterprise—notably, the establishment of Army Futures Command (AFC) and subordinate cross-functional teams (CFTs).

With the stand-up of AFC, the Army is currently making significant changes to its processes, particularly with respect to acquisition. In light of these institutional changes, TRADOC asked RAND Arroyo Center to take an outside and independent view of past and current DOTLPF-P processes to help TRADOC identify issues and necessary process changes to improve how the Army implements non-materiel DOTLPF-P solutions.[4]

To determine whether the Army historically was able to institute new changes or revise DOTLPF-P processes to address capability gaps, we conducted numerous analyses of Army data sets and information derived during interviews with TRADOC capability managers (TCMs) and the Capability Development Integration Directorate (CDID) representatives from seven proponents.

To identify processes the Army should pursue to ensure the successful development and integration of DOTLPF-P solutions, we analyzed characteristics of past efforts and current regulations, including analyses of 17 representative case studies. Although these representative case studies are examples of synchronized delivery, frequently involving the full spectrum of DOTMLPF-P, we attempt to highlight what we believe to be the primary focus each case study has on one or another domain, concentrating on what appears to be the primary domain of interest. However, it is important to note that virtually all domains are at play in the development of each.

Our assessment of DOTLPF-P indicates that many aspects of the current process appear to be successful, meaning that, across most domains, the processes for developing solutions and making change within DOTLPF-P domains were well defined, worked in the past, and have been employed both formally and informally to close gaps and make other necessary adjustments within the domains. That being said, when assessing the facilities domain, we identified unique challenges specific to modifying or constructing new facilities and developed subsequent recommendations in an effort to mitigate these challenges.

In light of our assessment and the significant changes being made to the Army's acquisition process, the Army should consider maintaining its current processes for the other domains while pursuing recommendations for the facilities domain, thereby driving further success of the modernization effort.

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[1] TRADOC, *The U.S. Army in Multi-Domain Operations 2028*, Fort Eustis, Va., TRADOC Pamphlet 525-3-1, December 2018.

[2] HDQA, *2019 Army Modernization Strategy: Investing in the Future*, Washington, D.C., 2019b.

[3] HDQA, 2019b.

[4] We identified relatively little previously published research into these questions, as broadly defined.

Doctrine and Policy

Processes and procedures for making changes to, or developing solutions within, the doctrine and policy domains are explicitly outlined by TRADOC Regulation 25-36, *The TRADOC Doctrine Publication Program*; Army Regulation 25-30, *Army Publishing Program*; and Department of the Army Pamphlet 25-30, *Army Publishing Program Procedures*.[5] Doctrine is introduced, revised, or eliminated routinely. However, there are still several issues that can arise throughout the drafting processes. These issues can stem from disagreements over prioritization, the issuance of executive orders, disagreements regarding language used in a document, a failure to appropriately resource the drafting of doctrine or policy, or even rescission after a document has already been published and distributed.

A dynamic process exists for regularly reviewing and updating doctrine and regulations, with changes being made frequently. Doctrine and regulations are often revised after their initial introduction and dissemination. As shown in Figure 1, since 1977, nearly 50 percent of all Army doctrine and regulations were updated within the past eight years. In other words, in the past eight years, 50 percent of doctrine has been revised.

The primary mechanisms that help ensure continued doctrine and policy success are **funding**, **prioritization**, and **comment resolution**. Our analyses suggest that funding is not a significant issue. Regarding prioritization, suggested changes must be high enough on a priority list to justify their development or revision. Lastly, a failure to resolve comments, especially major and critical comments, may lead to delays. If comments are not resolved by the end of the final draft stage of publication, then a doctrine review and approval group may be necessary, which would need to be staffed by a different team of developers and writers, ultimately delaying the validation of the publication.

FIGURE 1

Timeline for Revisions to Army Doctrine and Regulations (from 1977 to present)
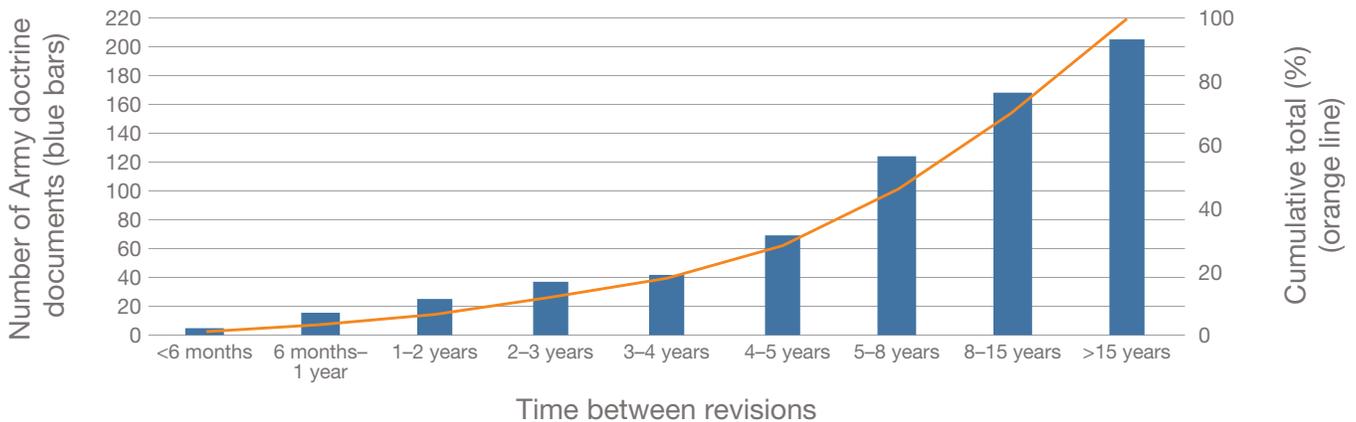
SOURCE: Analysis of Army doctrine and regulations published since calendar year 1977, as included in Army Publishing Directorate, website, undated (accessed October 24, 2019).

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[5] TRADOC, *The TRADOC Doctrine Publication Program*, Fort Eustis, Va., TRADOC Regulation 25-36, May 21, 2014; HDQA, *Army Publishing Program*, Washington, D.C., Army Regulation 25-30, June 3, 2015; HQDA, *Army Publishing Program Procedures*, Washington, D.C., Department of the Army Pamphlet 25-30, June 13, 2018a.
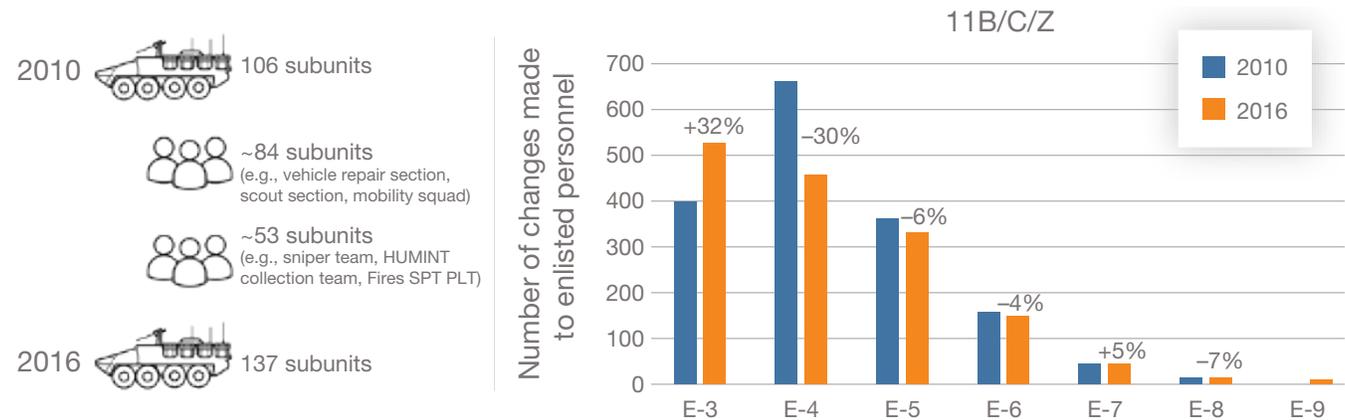
Organization

Through interviews, doctrinal review, and analysis of Army Force Management System (FMS) website data, we examined several large- and small-scale organizational changes that have taken place over the past 20 years (since about 2000).[6] Overall, it appears that the Army was able to implement numerous organizational changes, on both small and large scales. Changes are formal, follow a specific Total Army Analysis process, and can be accelerated by senior Army leaders.

For three large-scale changes—the creation of SBCTs, the Army's shift to modularity, and the creation of Security Force Assistance Brigades—we looked at what made each of these successful. We found three criteria that contributed to successful changes—**senior-leader interest and support**, which enables solution implementation; **rapid solution institutionalization**, allowing the change to rapidly become part of the broad Army, both institutionally and culturally;

and **demonstrated operational utility**, providing a rationale for the solution to continue to be resourced and amended as it meets deploying units' needs.

Looking at small-scale changes, the Army has made incremental, but substantive, changes in its Brigade Combat Team force structure, all of which were likely integrated packages, both affecting and affected by combinations of change across the DOTMLPF-P framework. For example, as shown on the left side of Figure 2, in 2010, SBCTs consisted of 106 subunits. Over the next six years, subunits were both added and removed, yielding a total of 137 subunits in 2016. In that same time frame, as shown on the right side of Figure 2, SBCTs added more than 100 11B/C positions at the grade of E-3; added two 11B positions at the grade of E-7; reduced the number of 11B/C positions at E-4, E-5, and E-6, and reduced the number of 11Z positions at E-8.

FIGURE 2

Small-Scale SBCT Changes, 2010–2016: Changes Made to Subunits (left) and Changes Made to Enlisted Personnel 11B/C/Z Military Occupational Specialties (right)

SOURCE: RAND Arroyo Center analysis of FMS data; see FMSweb, website, undated (accessed November 19, 2019).
NOTE: HUMINT = human intelligence; SPT PLT = fires support platoon.

> **Within the organization domain, proponents can both develop and propose changes, with small-scale changes happening with reasonable frequency and large-scale changes primarily being driven by senior leadership.**

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[6] Processes and procedures for making changes to or developing solutions within the organization domain are explicitly outlined by HQDA, *Warfighting Capabilities Determination*, Washington, D.C., Army Regulation 71-9, August 15, 2019a; and TRADOC, *Force Development: Concept Development, Capabilities Determination, and Capabilities Integration*, Fort Eustis, Va., TRADOC Regulation 71-20, June 28, 2013.

Training

The Army's approach to training begins with the Army Learning Model, which considers the service's broader need to develop personnel for operational effectiveness.[7] The Army has well-defined processes for the development of training solutions to rectify capability gaps and implement other changes within the domain.

Our analysis suggests that training solutions are frequently developed within the Army's Centers of Excellence and, therefore, are not always well documented at the Army level. There are, however, avenues for Army-wide training changes. Training changes can be driven from the ground up in response to lessons learned or capability integration or from the top down in response to Army needs. To a large extent, the pathway for a training solution depends on whether it is part of a larger materiel solution or proposed as an independent training solution with limited materiel changes.[8]

Table 2 shows the observations based on discussions with TCMs and CDID representatives. They did not indicate that there were any significant difficulties with getting training gaps identified, requirements formulated, and solutions resourced.

As part of our assessment of the training domain, we examined five cases of DOTLPF-P solutions in which the

> **Within training, changes occur across all parts of the Army. There were no significant difficulties with getting gaps identified, requirements formulated, and solutions resourced, and Centers of Excellence did not highlight that any desired needs were not resourced.**

training domain was, subjectively, the most significant domain. The five training case studies were: Joint Fires Observer (2008–2010), Female Engagement Team (2010–2014), Combat Advisor Training Course (2017–present), Army Synthetic Training (1991–present), and Basic Training and Advanced Leader Course (2005–present). We developed a historical narrative of why and how the solution was developed, determined whether it was a success, and, if so, the reasons for its continued viability. For each case study, we identified whether senior-leader interest and support, rapid solution institutionalization, and demonstrated operational utility existed. In each case, all three were present during the earliest stages of development.

TABLE 2

Training Activities and Interview Observations

Activity	Observations from TCM and CDID Interviews
Funding	• Improvements to Army training often require an increase in funds, as programs of instruction are the definitive requirements documents for each course. Although this allows for the development of training solutions that can be linked directly back to operational needs, it can make larger ground-level changes more difficult. • If new learning products are disseminated, they might not come with additional resources. If units are expected to shift internal resources to support training, it may end up underresourced because of competing requirements. For an Army-wide training change to be effective, it may require additional funds.
Prioritization	• There were no reported significant challenges as to how training requirements are prioritized by the Combined Arms Center and the Army, once identified. TRADOC and Army regulations offer clear guidance for prioritization.
Formation	• No significant challenges are apparent in identifying training capability gaps and formulating requirements.
Development	• Although complicated, TRADOC and Army regulations provide a well-defined process for training development. CDIDs and TCMs did not report significant barriers to developing training capabilities.
Validation	• No significant barriers were identified concerning the validation of training solutions.
Implementation	• No significant barriers to implementation of Army training once developed, validated, and funded were identified.

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[7] TRADOC, *Army Learning Policy and Systems*, Fort Eustis, Va., TRADOC Regulation 350-70, July 2017, p. 22.

[8] TRADOC, 2017, pp. 87–94. Processes and procedures for making changes to or developing solutions within the training domain are explicitly outlined by TR 71-20 (TRADOC, 2013) and TR 350-70 (TRADOC, 2017).

Leadership and Education

Leadership and education are regularly revised; however, content and products in the domain are not meant to change quickly—changes in less than a year are strongly discouraged.[9] The most significant hurdle in developing leadership and education solutions is that these typically require substantial lead times for development and implementation. However, modification of leadership and education content is not an inflexible process, and the domain proved to be sufficiently responsive to changes in Army needs and requirements. After conducting interviews and reviewing three cases of change in this realm,[10] we determined that there are many potential characteristics associated with success, which can include the timing of the establishment, the flexibility of the institution, warfighter demand, soldier satisfaction, and mission relevance, among other things.

U.S. Army Forces Command's Command Sgt. Maj. Michael A. Grinston speaks to Soldiers of E Company, 2nd Battalion, 506th Infantry Regiment, 3rd Brigade Combat Team, 101st Airborne Division at Ft. Campbell, on May 22, 2018. Photo by SGT Steven Lopez.

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[9] Processes and procedures for making changes to or developing solutions within the leadership and education domain are explicitly outlined by TR 71-20 (TRADOC, 2013) and TR 350-70 (TRADOC, 2017).

[10] The cases are the Institute for Noncommissioned Officer Professional Development, Asymmetric Warfare Adaptive Leader Program, and Center for Army Profession and Leadership.

Personnel

Changes are regularly made that affect personnel management functions, and, within each, there are a variety of levers that can be pulled to influence outcomes.[11] In conducting interviews, we did not encounter anyone who wanted to make changes within their proponency but were unable to do so. However, personnel changes across proponents are difficult and unlikely to happen without senior-leader advocacy.

To evaluate the frequency of personnel changes, we first looked at notification of future change (NOFC) data to determine how many personnel-coding changes have taken place. Our analysis suggests that personnel changes happen frequently, with the number of changes varying across proponents. Eight proponents had ten or more requests for change over a five-year period, with the greatest number

of changes occurring within cyber, medical, aviation, and intelligence (see Figure 3).

Table 3 shows the revision, establishment, deletion, or extension of suitability across the personnel categories in the columns. A total of 453 personnel coding actions occurred during FYs 2014–2018, with 150 being changing military occupational specialties. Based on these results and interviews, personnel changes occur with relative ease within given proponents, though cross-proponent changes, or changes that affect other proponents, likely require HQDA-level intervention. The processes for making changes are formal and follow specific processes laid out in governing regulations.

FIGURE 3

Number of Personnel-Coding Changes, by Organization, for FYs 2014–2018

> For the personnel domain, changes within a proponent are more feasible than cross-proponent changes, which likely require HQDA-level intervention.
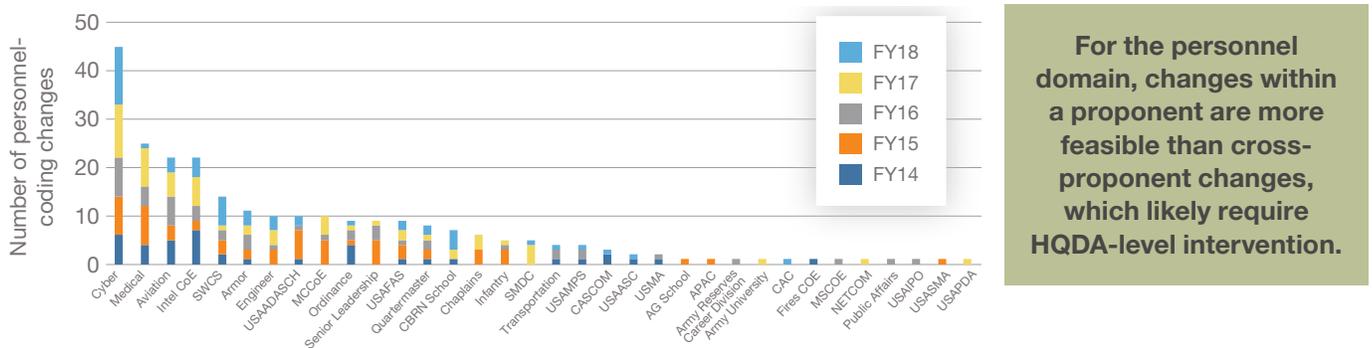
SOURCE: Analysis of NOFC data.

NOTE: CoE = Center of Excellence; SWCS = John F. Kennedy Special Warfare Center and School; USAADASCH = U.S. Army Air Defense Artillery School; MCCoE = Mission Command Center of Excellence; USAFAS = U.S. Army Field Artillery School; CBRN = chemical, biological, radiological, and nuclear; SMDC = Space and Missile Defense Command; USAMPS = U.S. Army Military Police School; CASCOM = Combined Arms Support Command; USAAC = United States Army Accessions Command; USMA = U.S. Military Academy; AG = adjutant general; APAC = Army Public Affairs Center; CAC = Combined Arms Center; NETCOM = Network Enterprise Technology Command; USAIPO = U.S. Army Information Operations Proponent; USASMA = U.S. Army Sergeants Major Academy; USAPDA = U.S. Army Physical Disability Agency.

TABLE 3

Personnel Coding Actions for FYs 2014–2018

NOFC Mentions	Military Occupational Specialty	ASI	SI	AOC	PDSI	SQI	FA	CMF	Branch	RC	Total
Revision	121	53	34	26	2	8	5	6	13	3	271
Establishment	14	48	20	3	29	2	1	3	2	4	126
Deletion	11	21	3	5	6	1	2	1	1	0	51
Extension of suitability	4	0	0	1	0	0	0	0	0	0	5

NOTE: ASI = additional skill identifier; SI = skill identifier; AOC = Army occupational category; PDSI = personnel development skill identifier; SQI = special qualification identifiers; FA = functional area; CMF = career management field; RC = reporting code.

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[11] Eight functions are derived from the Army's life-cycle model and all fall under the category of personnel management. Those life-cycle management functions are structure, acquisition, distribution, development, deployment, compensation, sustainment, and transition.

Facilities

There are many avenues by which new equipment or changes in the other DOTLPF-P domains can generate requirements for new or modified facilities: New equipment requires maintenance facilities or may lead to changes in doctrine that then require changes to ranges or new or modified training facilities.[12] The processes for making changes within the facilities domain are well defined, and changes in this domain occur frequently. However, there are nonetheless challenges that can occur in this domain that we did not find when we examined the other domains. These challenges are as follows:

- Planning, design, and construction are time-consuming.
- Facility investments are often driven by installation-specific factors that are not apparent until after stationing decisions are made.
- Army planning responsibilities for facilities may have misalignments and gaps that prevent the Army from anticipating facilities requirements for new equipment.
- Historical Army difficulties in planning for stationing could potentially be repeated if large facility investments for new equipment are required.
- Army planning processes for facilities are relatively untested by large-scale changes to equipment facility requirements.
- Historically, Army military construction funding has been stressed, which could place funding pressures on facilities for new equipment.

> **There are several challenges associated with subsequently constructing or modifying facilities, and even changes in other domains can affect facilities. Large-scale changes can exacerbate these challenges, and changes may outpace facility investments.**

- There is a lack of analysis about the sufficiency of military construction planning for acquisition programs.

Our analytic review suggests three possible actions that could assist in mitigating challenges:

- The Office of the Deputy Chief of Staff, G-9 (Installations), U.S. Army, or such organizations as the Office of the Assistant Secretary of the Army for Installations, Energy and Environment (ASA [IE&E]) could take on more-formal responsibilities for the facility aspects of capability acquisition and life-cycle planning.
- The roles of the G-9 and ASA (IE&E) could be further standardized in the capability-development and acquisition processes to enhance their roles during planning, programming, budgeting, and execution.
- Shifting facility investment strategy, facility investment guidance, and associated program objective memorandum processes could help to accommodate large-scale facility investments for new equipment.

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[12] Processes and procedures for making changes to or developing solutions within the facilities domain are explicitly outlined by Army Regulation 70-1 (HQDA, *Army Acquisition Policy*, Washington, D.C., Army Regulation 70-1, August 10, 2018b) and Army Regulation 420-1 (HQDA, *Army Facilities Management*, Washington, D.C., Army Regulation 420-1, February 12, 2008, administrative revision March 6, 2019). Also see TRADOC Regulation 71-20 (TRADOC, 2013, p. 73).

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About This Report

This report documents research and analysis conducted as part of a project entitled *U.S. Army Non-Materiel Capability Development*, sponsored by U.S. Army Training and Doctrine Command. The purpose of the project was to identify issues and develop recommendations to improve the processes for prioritizing investment in and implementation of non-materiel solutions that have the potential to mitigate Army capability gaps.

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