



NATIONAL DEFENSE RESEARCH INSTITUTE

THE ARTS

CHILD POLICY

CIVIL JUSTICE

EDUCATION

ENERGY AND ENVIRONMENT

HEALTH AND HEALTH CARE

INTERNATIONAL AFFAIRS

NATIONAL SECURITY

POPULATION AND AGING

PUBLIC SAFETY

SCIENCE AND TECHNOLOGY

SUBSTANCE ABUSE

TERRORISM AND
HOMELAND SECURITY

TRANSPORTATION AND
INFRASTRUCTURE

WORKFORCE AND WORKPLACE

This PDF document was made available from www.rand.org as a public service of the RAND Corporation.

[Jump down to document](#) ▼

The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world.

Support RAND

[Purchase this document](#)

[Browse Books & Publications](#)

[Make a charitable contribution](#)

For More Information

Visit RAND at www.rand.org

Explore [RAND National Defense
Research Institute](#)

View [document details](#)

Limited Electronic Distribution Rights

This document and trademark(s) contained herein are protected by law as indicated in a notice appearing later in this work. This electronic representation of RAND intellectual property is provided for non-commercial use only. Permission is required from RAND to reproduce, or reuse in another form, any of our research documents.

This product is part of the RAND Corporation monograph series. RAND monographs present major research findings that address the challenges facing the public and private sectors. All RAND monographs undergo rigorous peer review to ensure high standards for research quality and objectivity.

Civilian Workforce Planning in the Department of Defense

Different Levels, Different Roles

Susan M. Gates, Christine Eibner, Edward G. Keating

Prepared for the Office of the Secretary of Defense

Approved for public release; distribution unlimited



NATIONAL DEFENSE RESEARCH INSTITUTE

The research described in this report was prepared for the Office of the Secretary of Defense (OSD). The research was conducted in the RAND National Defense Research Institute, a federally funded research and development center sponsored by the OSD, the Joint Staff, the Unified Combatant Commands, the Department of the Navy, the Marine Corps, the defense agencies, and the defense Intelligence Community under Contract DASW01-01-C-0004.

Library of Congress Cataloging-in-Publication Data

Gates, Susan M., 1968–

Civilian workforce planning in the Department of Defense : different levels, different roles / Susan M. Gates, Christine Eibner, Edward G Keating.

p. cm.
"MG-449."

Includes bibliographical references.

ISBN 0-8330-3901-6 (pbk. : alk. paper)

1. Manpower planning—United States. 2. United States—Armed Forces—Civilian employees. 3. United States. Dept. of Defense—Personnel management. I. Eibner, Christine. II. Keating, Edward G. (Edward Geoffrey), 1965– III. Title.

UB193.G375 2006
355.6'190973—dc22

2006008446

The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.

RAND® is a registered trademark.

© Copyright 2006 RAND Corporation

All rights reserved. No part of this book may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, or information storage and retrieval) without permission in writing from RAND.

Published 2006 by the RAND Corporation

1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138

1200 South Hayes Street, Arlington, VA 22202-5050

4570 Fifth Avenue, Suite 600, Pittsburgh, PA 15213-2612

RAND URL: <http://www.rand.org/>

To order RAND documents or to obtain additional information, contact

Distribution Services: Telephone: (310) 451-7002;

Fax: (310) 451-6915; Email: order@rand.org

Preface

The Department of Defense (DoD), along with other federal agencies, is striving to improve the effectiveness and efficiency of its civilian workforce and to address impending personnel challenges, such as the possible retirement of a large portion of its civilian workforce. The Department is evaluating the extent to which comprehensive, data-driven approaches to understanding civilian workforce planning can facilitate achievement of these goals.

The DoD asked the RAND Corporation to explore how civilian workforce planning and requirements determination are accomplished at specific installations, to identify potential roles for the Office of the Secretary of Defense (OSD) in the planning process, and to identify potential data sources for Department-wide workforce planning.

This monograph presents the results of our effort. The research was based on a review of the literature on workforce planning and requirements determination, an analysis of existing data sources, and interviews with individuals involved in workforce-planning activities at the service, agency, and local levels.

This monograph will be of interest to officials responsible for DoD civilian workforce planning, as well as to those responsible for workforce requirements in other government agencies.

This research was sponsored by the Office of the Under Secretary of Defense for Program Integration and was conducted within the Forces and Resources Policy (FRP) Center of the RAND National Defense Research Institute, a federally funded research and

development center sponsored by the Office of the Secretary of Defense, the Joint Staff, the Unified Combatant Commands, the Department of the Navy, the Marine Corps, the defense agencies, and the defense Intelligence Community.

For more information on RAND's FRP Center, contact the Director, James Hosek. He can be reached by email at James_Hosek@rand.org; by phone at 310-393-0411, extension 7183; or by mail at the RAND Corporation, 1776 Main Street, Santa Monica, California 90407-2138. More information about RAND is available at www.rand.org.

Contents

Preface	iii
Figures	ix
Tables	xi
Summary	xiii
Acknowledgments	xxv
Acronyms	xxvii

CHAPTER ONE

Introduction	1
Objectives	2
Methodology	3
The Workforce-Planning Framework	3
Workforce Planning in Large Organizations	5
Site Visits	7
Review of Data Sources to Support Department-Wide Efforts	11
Organization of the Monograph	11

CHAPTER TWO

Local Workforce-Planning Efforts	13
Overview of Sites Visited	13
Dahlgren Naval Surface Warfare Center	16
Defense Supply Center–Philadelphia	17
Fort Lewis	17
Patuxent River Naval Air Warfare Center Aircraft Division	18

Norfolk Naval Shipyard 19

Tinker Air Force Base 20

Key Findings from Site Visits 20

 Each Installation Conducts Workforce Planning to Some Degree 21

 Local Supply Analysis Is Based on Defense Civilian Personnel Data
 System Data 23

 Approaches to Demand Analysis Vary Widely Across Installations 27

 DoD Installations Identify Workforce Gaps 35

 Installations Use a Variety of Strategies to Address Workforce Gaps... 36

 Data Have Benefits for Workforce Planning and Workforce
 Flexibility, but the Costs of Collecting Data Can Be High..... 44

Summary of Site-Visit Findings 46

CHAPTER THREE

Data Sources for DoD-Wide Workforce Planning 51

Data Sources for Supply Analysis 52

 Overview of the DMDC/DCPDS Data 52

 Using DMDC Civilian Workforce Data to Support Department-
 Wide Supply Analysis 54

 DMDC Data Can Also Support an Examination of
 Employee Turnover 55

DMDC Data Can Provide Useful Information to Support
 Departmentwide Supply Analysis, but Questions Remain 58

Data Sources to Support DoD-Wide Demand Analysis 61

 Manpower Estimates Reports as a Potential Data Source for Demand
 Analysis 63

 Overview of MERs Reporting Requirements 63

 Information Provided in MERs Is Not Particularly Useful for Civilian
 Workforce Planning 65

 Analyses Underlying the MERs Are Not Supported by a Systematic
 Civilian Workforce-Planning Process..... 66

 Information Developed for A-76 Studies Would Be a Much Richer
 Target for Data-Gathering Efforts 66

 DMDC Data Can Be Used to Help OSD Identify Targets for
 Centralized Coordination 69

Summary 83

CHAPTER FOUR

Conclusions and Recommendations 85

Conclusions 85

 Workforce Planning in DoD Is More Complicated Than the Basic
 Workforce-Planning Framework Would Suggest 86

 DCPDS Data Provide a Rich Starting Point for Supply Analysis at
 All Levels 87

 Approaches to Demand Analysis Are More Varied and Sources of
 Data Are Limited 88

 Gaps Analyses and Policy Responses Depend on the Level at Which
 Workforce Planning Occurs 90

 It Is Important to Weigh the Costs and Benefits of Additional Data
 Collection 90

Recommendations 91

 Certain Occupations or Geographic Regions Might Benefit from a
 Department-Wide Workforce-Planning Perspective 92

 OSD Could Help to Improve Existing Data Systems 93

 OSD Could Promote the Collection of Requirements Data Through
 CAMIS 94

 OSD Could Work to Make the Gaps-Analysis Process Meaningful ... 95

 Better Integration of Strategic Workforce Planning and Budget
 Processes Is Needed 95

 Ensure That the National Security Personnel System Is Responsive to
 Strategic Workforce-Planning Needs 96

APPENDIX

A. Site-Visit Interview Protocol 99

B. Examples of Civilian Workforce Analyses Using DMDC Data ... 107

References 117

Figures

1.1.	Workforce Planning Typically Has Four Steps	4
2.1.	Occupational Characteristics of DoD and Specific Sites	15
2.2.	NAVAIR's Skills Database	25
2.3.	Response to Changes in Workload—Churn—at the Naval Shipyards: The Corporate Production Resources Team	29
2.4.	Churn Chart for Naval Shipyards	32
2.5.	Addressing Workforce Gaps at Tinker AFB	38
2.6.	Workforce Planning at DoD Installations	48
3.1.	Installation-Level Separation of DoD Civilian Employees	56
3.2.	Separation of DoD Civilian Employees	58
3.3.	Army Data Warehouse and Forecasting Tool Provides an Example of How DMDC Data Could Be Used	59
B.1.	Largest Employers of DoD Civilians	108
B.2.	Fraction of an Installation's Civilian Workforce over Age 50 ...	110
B.3.	DoD Civilian Employment, by Functional Occupational Group	112
B.4.	Median Years of Service, by Functional Occupational Group	113

Tables

1.1.	Requested Site-Visit Interviews	9
1.2.	Site-Visit Protocol	10
2.1.	Characteristics of Sites Visited	14
2.2.	Tradeskill Designators for the Painting and Blasting Tradeskill.....	33
3.1.	Concentration of DoD Civilian Personnel, by Functional Occupational Group.....	71
B.1.	Distribution of Experience, Selected Occupations	114

Summary

In response to more than a decade of downsizing and restructuring, the Department of Defense (DoD) is engaged in a human-resources strategic planning effort to address resulting imbalances in both skills and experience levels in many parts of DoD. The current human-resources strategic plan addresses the need to provide management systems and tools to support total workforce planning and informed decisionmaking (U.S. Department of Defense, 2003b). Attention to Department-wide civilian workforce planning stems in part from the President's Management Agenda of 2001 and the continuing assessments of Department-level progress on workforce planning. DoD civilian workforce-planning efforts are complicated and, at the same time, made more important by the implementation of the National Security Personnel System (NSPS), slated to begin in 2006. The NSPS will replace the traditional federal civil service personnel management system within DoD, providing DoD managers with more management flexibility.

To support Department-wide efforts, the DoD asked the RAND Corporation to explore how workforce planning and requirements determination are accomplished at specific installations, to identify potential roles for the Office of the Secretary of Defense (OSD) in the planning process, and to identify potential data sources for Department-wide workforce planning.

Objective

The primary aim of this study is to consider DoD civilian workforce planning from a Department-wide perspective. We do so by taking a close look at local (installation-level) workforce-planning efforts, assessing the challenges that such efforts face, and considering the ways in which a Department-wide perspective might support or enhance local activities. The objectives of this research are to

- describe the workforce-planning process, including the sources of data and methods used for workforce planning, at individual military bases
- identify challenges to workforce planning at these sites
- consider the options for DoD-wide workforce-planning efforts or OSD-level support for local efforts.

In the process of examining installation-level efforts, we learned about workforce-planning efforts at the service, agency (e.g., the Defense Logistics Agency, the Defense Finance and Accounting Service), and command levels.

Although we do not provide a comprehensive or systematic look at such higher-level efforts across DoD, we do report information on such efforts that relates to our six sites.

Approach

In addressing the objective of this project, we applied a bottom-up research approach. The centerpiece of our research effort was site visits at installations to gather information on local workforce-planning efforts. Data collection at the sites was informed by a simple, generic workforce-planning model. This model has four basic steps:

- Step 1 is to forecast demand—i.e., to estimate the staffing levels and competencies required in the future workforce. The term

workforce requirements is often used to describe the output of the demand forecast. These *requirements* reflect the required number of positions and characteristics that the workers who fill those positions must have in order for the organization to meet its strategic intent.

- Step 2 (which may be performed in tandem with Step 1) is to project workforce supply. This step involves projecting current staffing levels and competency profiles into the future, based on current trends in hiring, attrition, and retention.
- Step 3 brings together the results of Steps 1 and 2 to identify any gaps between supply and demand.
- Step 4 is to develop strategies that address the key gaps.

This conceptual framework provides the structure for our research activities.

In our research, we conducted case studies at six purposefully selected DoD installations. The six sites we visited were Dahlgren Naval Surface Warfare Center, Virginia; Tinker Air Force Base, Oklahoma; the Defense Supply Center in Philadelphia (DSCP); Patuxent River Naval Air Warfare Center, Maryland; Norfolk Naval Shipyard (NNSY), Virginia; and Fort Lewis, Washington. We selected these six sites for in-depth analysis and to visit a variety of installations with different organizational missions and workforce characteristics. The sites were drawn from a variety of services/agencies, including the Army, Navy, Air Force, and Defense Logistics Agency (DLA). The sites were diverse in the age distribution and occupational characteristics represented in the civilian workforce. Finally, the sites were geographically diverse, located in the Northwest, Midwest, South, and Northeast.

The final sample reflects our best efforts to achieve a diverse sample according to the characteristics just discussed. Ultimately, we were limited by the willingness of installations to host a time-intensive site visit. One limitation of our final sample is that a disproportionate number of the sites were Navy installations. We document the workforce-planning activities at these installations and

review data sources that could potentially support DoD-wide workforce-planning efforts.

Findings

Although workforce-planning and requirements-determination processes are in place to varying degrees at DoD installations, DoD currently lacks a Department-wide process for the civilian workforce. However, DoD does possess a set of resources that would provide a starting point for the development of a DoD-wide workforce-planning role.

Workforce Planning in DoD Is More Complicated Than the Basic Workforce-Planning Framework Would Suggest

Our site visits indicate that a wide variety of workforce-planning approaches is currently practiced in DoD. All installations engage in some form of supply analysis, using personnel data from the Defense Civilian Personnel Data System (DCPDS). Many commands, services, and agencies take an organizationwide look at workforce supply as well. The main limitation of existing data is a lack of information on competencies and skills.

Demand analysis and gaps analysis are significantly more challenging for DoD installations than the basic workforce-planning framework would suggest. First, nearly all installations reported some difficulty in estimating customer demand. Installations also vary in their ability to translate customer demand into estimates of the required workforce. We also discovered that customer demand is not the only factor that managers must consider in assessing workforce demand. In the DoD, local managers face constraints on the total number of civilian work years they are allowed, as well as the total wage bill for civilian personnel. These additional constraints complicate gaps analysis, because local managers must be conscious of at least two gaps: that between the required (the estimated workforce needed or required to accomplish the organization's goals) workforce and the workforce supply, and that between the budgeted (the

workforce that can be supported with resources that have been budgeted for civilian personnel in that organization) workforce and the workforce supply. Gaps that are identified may vary in urgency and expected duration. Some gaps are immediate, whereas others will not emerge for many years into the future. Both immediate and distant gaps can be temporary or long-term.

DoD installations have a wide range of strategies for addressing gaps. Some strategies are more useful for addressing the difference between the required workforce and supply rather than the gap between supply and the budgeted workforce. Similarly, some strategies are more useful for immediate gaps and some are more useful for long-term gaps. The strategies for addressing gaps feed back into future supply-and-demand analysis, either directly or, indirectly, through the budgeting process and the production-planning process.

DCPDS Data Provide a Rich Starting Point for Supply Analysis at All Levels

DCPDS data, and the Civilian Personnel Master Files that the Defense Manpower Data Center (DMDC) compiles based on these data, provide information for supply analysis that can be used at all organizational levels. Specifically, this information could support DoD-wide supply analysis. DCPDS records an abundance of demographic and job-related information on all DoD civilian employees, including data on occupation, career history, wage grade, base location, and years of service.

Yet, although the DCPDS data have many advantages, they are also limited because reporting of specific fields is not consistent across DoD and because reporting of information on skills and competencies is limited.

Approaches to Demand Analysis Are More Varied and Sources of Data Are Limited

Demand analysis involves two important types of data: projections of customer demand and data that allow that demand to be translated into workforce requirements. The DCPDS data are a source of DoD-wide information that can be used for supply analysis; however, we

found no DoD-wide data sources that are available for demand analysis. Few organizations appear to have concrete customer-demand projections that are translated into workforce demand. Even when customer-demand data are available, inherent variability in customer demand can get in the way of workforce planning. Data systems can raise an organization's awareness of changes in customer demand, but they may not help the organization respond to such changes.

We reviewed two potential sources of information for Department-wide demand analysis, Manpower Estimates Reports (MERs) and Most Efficient Organization (MEO) reports, and found each lacking comprehensive data on customer demand and workforce requirements for the DoD.

Program managers of major acquisition programs are required to submit MERs, indicating the personnel needs that will exist over the life of the program. The guidelines for developing the MER are consistent with the process for demand analysis: The general "customer," or program, demands are articulated, and those demands are translated into estimates of military, civilian, and contractor workforce requirements. Although this process sounds useful in theory, the MER guidelines require the reporting of workforce requirements only at an aggregate level and do not lead to the generation of detailed and consistent reports of civilian manpower requirements by grade level, occupation, or skill level. As a result, no database on civilian workforce requirements results from the MER process. Even if there were, it would be of limited usefulness for a Department-wide requirements-determination process, because it would cover only personnel who work on the acquisition programs that are required to submit MERs.

Another process that generates information on customer demand and workforce requirements is the development of MEOs that occurs as part of an A-76 cost comparison. *A-76* refers to the Office of Management and Budget circular that specifies the procedures that the federal government must follow when it competitively sources a function that is currently being provided by civil service or military employees.

As part of the A-76 process, an organizational unit must develop a Performance Work Statement (PWS), specifying the work that needs to be accomplished without articulating how that work should be performed. Managers must then consider the specifications of the PWS and develop a detailed workforce plan—called the Most Efficient Organization—for accomplishing that work with the in-house workforce. In theory, these reports could feed into data systems that record information on customer demand and on the workforce used to meet such demand. As with the MERs, MEOs do not cover the entire civilian workforce, only the workforce required to perform specific functions that the DoD seeks to competitively source. However, they are focused on activities that are currently performed by DoD civilians, rather than by military personnel or contractors.

The process of translating estimates of customer demand into specific workforce requirements involves the application of historical data to validated formulas or relationships. Data on customer projections are not available for all activities. Even when they are available—for example, in the shipyards—they are often subject to change. Similarly, validated formulas that relate customer demand to workforce requirements exist for only a small number of activities with stable demand and relatively clear methods for accomplishing the task.

Gaps Analyses and Policy Responses Depend on the Level at Which Workforce Planning Occurs

A primary reason for conducting demand-and-supply analysis is to enable an organization to perform gap analysis. The gap analysis should lead to action on the part of the organization to eliminate those gaps. A finding that arose from our analysis is that gaps that are identified and the tactics to address those workforce gaps are influenced by the level at which workforce planning occurs. Such efforts are undertaken at local installations and at the command, service, and agency levels. Efforts to address gaps at the DoD-wide level are currently limited to specific occupations or specific functional areas.

It Is Important to Weigh the Costs and Benefits of Additional Data Collection

A lack of data, both on the skills and competencies of the workforce and on customer demand, limits workforce planning at several of the installations we visited. Additional data collection would be required to support DoD-wide demand analysis, and gap analysis in particular. However, one of the lessons that we learned from our site visits is that data collection is costly; the costs may sometimes outweigh the benefits.

The value of additional data collection may also vary by occupation. It may be less costly to develop skills codes and labor standards for highly structured, frequently repeated tasks, such as those performed at Navy shipyards and Air Force and Army depots. In contrast, the costs associated with developing skills codes and labor standards for occupations in which tasks are more likely to be organization-specific, such as research-and-development tasks, may outweigh the benefits. It may also be difficult to develop skills codes and labor standards for high-tech occupations, since job requirements in these fields change very quickly as technology advances.

Recommendations

In crafting policy recommendations for OSD, we considered two important questions. First, what needs would DoD-wide workforce planning serve in what contexts? Second, how might OSD add value to the workforce-planning process by supporting local and agency-wide efforts?

Certain Occupations or Geographic Regions Might Benefit from a Department-Wide Workforce-Planning Perspective

The organizational level at which workforce planning should be conducted depends on many factors, including the size of an occupation or workforce and the distribution of that occupation or workforce across DoD. In most cases, workforce planning should be left to local installations or other organizational units, such as commands, agen-

cies, or functional sponsors, which may be more attuned to their specific personnel requirements than OSD. Yet, OSD can play a supportive role by helping to identify the need for coordinated efforts across installations or occupations within DoD.

To identify potential candidates for DoD-wide coordination, we conducted an analysis of Functional Occupational Groups. *Functional Occupational Groups* are occupation-based categories used to aggregate the workforce into groups based on the type of function a worker performs and/or the occupation of which s/he is part. Each worker is assigned to one of 38 occupation categories in the DMDC database. Examples are Metal Workers, Engineers, and Central Management. Our analysis distinguishes among Functional Occupational Groups that (1) are highly concentrated in one bureau, (2) are concentrated in two or three bureaus, and (3) are fairly broadly dispersed across DoD. For Functional Occupational Groups that are highly concentrated in one or two bureaus, such as Medical Attendants, it would not likely make sense to engage in Department-wide workforce planning. However, OSD may want to encourage the organization that is the primary employer to take the lead in workforce planning-related activities, including the development of workforce-competency definitions and data-gathering efforts. OSD could support outreach efforts or communication between the lead bureau and other bureaus. For functional occupations whose workforces are dispersed fairly broadly throughout DoD—such as support and management activities, including personnel management, fire and police, data systems management, and secretarial—it might make sense for OSD to take the lead in workforce planning, if OSD concludes that there would be some benefit to DoD-wide coordination of workforce planning in these areas. DoD-wide coordination might also make sense in certain geographic areas, such as Washington, D.C., where more than one service or agency employs civilians.

Because the benefits of DoD-wide workforce planning may be greatest where there are possible benefits to be reaped by moving individuals across locations to address workforce gaps, OSD might focus attention initially on areas for which the workforce requires a

relatively high degree of specialized training and where the workforce is not primarily local. Examples of such areas are human resources professionals, financial clerks, and medical attendants.

OSD Could Help Improve Existing Data Systems and Their Use

There are several ways that OSD could improve current DoD-wide data-collection efforts without imposing unduly high costs on the services and/or agencies. First, OSD could advocate broader use of existing fields, such as skills codes, in the DCPDS, without necessarily requiring that managers report this information. OSD could also require more-frequent updating of the DCPDS education field to ensure that this information accurately reflects the current state of the workforce.

OSD Could Promote the Collection of Requirements Data

Our research reveals that managers rely on a wide variety of data sources for demand analysis, that the level of detail available varies dramatically by location, and that there is no DoD-wide source of information on requirements. If OSD wanted to support the collection of better and more-consistent information on workforce requirements and have greater visibility over Department-wide workforce demand, the information in the Performance Work Statements and Most Efficient Organization studies, collected as part of A-76 cost-comparison studies, could serve as a starting point. These studies require an articulation of customer demand in the Performance Work Statement and a projection of the workforce required to perform the work in the MEO. The MEO must also discuss any gaps between supply and demand. The MEO template could be applied, even to activities that are not under consideration for competitive sourcing. However, these studies are costly to conduct and OSD must weigh the costs and benefits.

OSD Could Work to Make the Gaps-Analysis Process Meaningful

Our research highlights the fact that local DoD managers face a workforce-planning process that is substantially more complicated than the simple workforce-planning model would suggest. Local

managers must consider both the gap between workforce demand and workforce supply and the gap between workforce supply and the workforce that can be supported with budgeted resources. If DoD wants managers to take requirements determination seriously, it must devise a way to eliminate the distinction between required and budgeted resources. It is possible that better DoD-wide data on workforce requirements could support this aim.

Better Integration of Strategic Workforce Planning and Budget Processes Is Needed

Our study highlights the fact that the program objective memorandum (POM) process, and the budget process more generally, place substantial constraints on the ability of local managers to engage in effective strategic workforce planning—particularly when unexpected changes in demand require quick adaptation of the workforce. The development of an objective methodology for quantifying the relationship between mission and workforce requirements, coupled with a commitment to fully funding any mission, could facilitate a stronger link between the budget and workforce-planning processes. In addition, OSD (P&R) could work to promote a closer link between funding decisions and strategic workforce-planning processes. A study of how strategic personnel management is integrated (or not) into the POM process could yield some important insights into this issue.

These recommendations emphasize OSD's most likely roles in supporting and facilitating an activity that is primarily a local effort, and creating an environment in which workforce planning can be successful.

Acknowledgments

We thank the Department of Defense (DoD) employees who took the time to talk with us about civilian workforce-planning issues in their service, agency, or organization or at their installation. This research would have been impossible without their willingness to share and their frank and open comments. Although we offered to protect the confidentiality of interviewees, most interviewees were willing to be recognized for their participation in this research.

We are indebted to Altheda Anderson, Kenneth Baile, Billy Baxter, David Blackman, John Bray, Rick Buonviri, Brian Burke, Yvette Burke, Suzi Byrne, Pamela Campbell, General Kathleen Close, Michael Cook, Geri Cromley, Judy Crown, Dreux Daumer, Sherry Davis, Tania Dawson, Nancy Dolan, Ken Finlay, Terry Fisk, Keith Ford, Bob Freeland, Amy Gallo, Maryann Gaudio, Ron Glockner, Graham Harlowe, Phil Heiler, Janet Hoffheins, Terry Holland, Mike Hurley, Ellen James, Sherry Kabin, Brian Kern, Peter Kolakowski, Sharon Lacey, Michael Laney, Cynthia Lenning, Norma Lloyd, Carol Madonna, Jim Marcel, Denise Massimi, John McAndrews, Bob McCloskey, Jack McGovern, Steven McManus, Becky Morgan, Anne O'Connor, Marie Owens, Gregory Parton, Mark Patoka, Steve Perkins, Pete Peterson, Chris Puckett, Mike Regna, Ericka Reynolds, Ron Schmidt, Mark Shaw, Admiral Select Mark Skinner, Curt Smolinsky, Stewart Speck, Chuck Stagner, Jim Strickland, Captain Neil Stubits, Marlene Surrena, John Sweigart, Vinnie Terrell, Jim Thomas, Buddy Trueblood, Andrew Van Ohlen, Jimmy Vaughn, Bill Wagoner, Barbara Ward, Phyllis Woodring, Cindy Worcester,

and Paul Zebrowski. We very much appreciated the candid and insightful comments we received during our site visits.

We are indebted to our sponsors, Al Gallant and Karen Croom of the Office of the Secretary of Defense, Personnel and Readiness (Program Integration, Requirements Division). We appreciate their support in all aspects of the project, and their valuable feedback and guidance following interim presentations of our work.

We are grateful to the Defense Manpower Data Center for providing us with access to data on the DoD civil service workforce and, in particular, to Jim Creager for answering our endless questions about the files.

We also benefited from RAND seminar participants, and from conversations with RAND colleagues Georges Vernez, Al Robbert, and Dina Levy. RAND colleagues Georges Vernez and Carl Dahlman provided helpful reviews of an earlier draft of this document.

We thank Donna White and Linda Walgamott for their assistance with the administrative aspects of the field interview process and document preparation. Marian Branch provided a careful edit. Special thanks to Kristin Leuschner for her writing efforts, which were invaluable in communicating our findings in the final monograph you see here. Any errors or omissions that remain are solely the responsibility of the authors.

Acronyms

ACW	Air Control Wing
AFB	Air Force Base
AFMC	Air Force Materiel Command
APF	appropriated fund
ASAM	Automated Staffing Assessment Model
BRAC	Base Realignment and Closure
BSM	business systems modernization
CAMIS	Commercial Activities Management Information System
CDSA	Combat Direction Systems Activity
CIVFORS	Civilian Forecasting System
CPAC	Civilian Personnel Advisory Center
CPDF	Civilian Personnel Data File
CPP	Civilian Personnel Policy
CPRT	Corporate Production Resources Team
CSS	Coastal Systems Station
DCPDS	Defense Civilian Personnel Data System
DD	Dahlgren Division
DFAS	Defense Financing and Accounting Service
DISA	Defense Information Systems Agency
DLA	Defense Logistics Agency

DLAMP	Defense Leadership and Management Program
DMDC	Defense Manpower Data Center
DoD	Department of Defense
DP	directorates of personnel
DSCP	Defense Supply Center in Philadelphia
EHRI	Enterprise Human Resources Initiative
ERO	Engineering Refueling Overhaul
FHWA	Federal Highway Administration
FOGMOG	Functional Occupational Group
FRP	Forces and Resources Policy
FTE	full-time equivalent
FWS	Federal Wage System
FY	fiscal year
GS	General Schedule
HR	Human Resources
KSA	Knowledge, Skills, and Abilities
MAMC	Madigan Army Medical Center
MEO	Most Efficient Organization
MER	Manpower Estimates Report
NAF	nonappropriated fund
NAS	Naval Air Station
NAVAIR	Naval Air Systems Command
NAVSEA	Naval Sea Systems Command
NAWCAD	Naval Air Warfare Warfare Aircraft Division
NGNN	Northrop Grumman Newport News
NNSY	Norfolk Naval Shipyard
NSLP	National School Lunch Program
NSPS	National Security Personnel System

NSWC	Naval Surface Warfare Center
OC-ALC	Oklahoma City Air Logistics Center
OPM	Office of Personnel Management
OSD	Office of the Secretary of Defense
PAD	product area directors
PATCO	Professional, Administrative, Technical, Clerical, and Other White Collar
POM	program objective memorandum
PT	Painting and Blasting Tradeskill
PWS	Performance Work Statement
RCOH	Refueling/Complex Overhaul
RIF	reduction in force
SCEP	student career experience program
SES	Senior Executive Services
SPO	System Program Office
TSD	tradeskill designator
TVA	Tennessee Valley Authority
UIC	Unit Identification Code
U.S.C.	United States Code
VERA	Voluntary Early Retirement Authorization
Vo-Tech	vocational-technical
VSIP	Voluntary Separation Incentive Payment
WARR	Workload Allocation and Resource Reports
WASS	Workforce Analysis Support System
WCF	Working Capital Fund

Introduction

In response to more than a decade of downsizing and restructuring, the Department of Defense (DoD) is engaged in a strategic planning effort to address resulting imbalances in both skills and experience levels in many parts of DoD. Strategic workforce planning is particularly important because the DoD must compete with other government agencies, as well as with the private sector, for staff possessing a variety of critical skills (U.S. Department of Defense, 2003b). In fiscal year (FY) 2002, the Office of the Deputy Under Secretary of Defense for Civilian Personnel Policy (CPP) developed a set of strategic goals for the management of the DoD civilian workforce. This goal setting was done in conjunction with the Human Resources Directors of the Army, Navy, Air Force, Washington Headquarters Services, and Defense Logistics Agency. DoD's civilian human resources strategic plan emphasizes the importance of workforce planning for the civil service workforce (DoD, 2003b, p. 9). Goal 5 of the strategic plan is to "Provide Management Systems and Tools that Support Total Force Planning and Informed Decision Making" (p. 23).

Attention to Department-wide civilian workforce planning stems in part from the President's Management Agenda¹ of 2001 and the continuing assessments of Department-level progress on the

¹ See <http://www.whitehouse.gov/results/agenda/fiveinitatives08.html> for a description; accessed September 13, 2005.

major initiatives, including workforce planning and forecasting. Although DoD is being evaluated on a Department-wide basis, most civilian workforce-planning efforts are centered at lower organizational levels.

DoD is in the process of rolling out the National Security Personnel System (NSPS) in 2006. The NSPS will replace the traditional personnel management system in DoD. A primary guiding principle of the NSPS is to put mission first—in other words, to ensure that the personnel system acts in support of DoD’s mission. The implementation of NSPS will have unknown but important implications for workforce planning in DoD and provides DoD with an opportunity to revise long-standing workforce-planning and management processes.

Objectives

The primary aim of this study is to consider DoD civilian workforce planning from a Department-wide perspective. We do this by conducting case studies of local (installation-level) workforce-planning efforts, assessing the challenges that such efforts encounter, and considering the ways in which a Department-wide perspective might support or enhance local activities. The objectives of this research are to

- describe the workforce-planning process at six purposefully selected military bases, including the sources of data and methods used for workforce planning
- identify challenges to workforce planning at these sites
- consider the options for DoD-wide workforce-planning efforts or OSD-level support for local efforts.

In the process of examining installation-level efforts, we learned about workforce-planning efforts at the service, agency, and command levels. Although we do not provide a comprehensive, or sys-

tematic, look at such higher-level efforts across DoD, we do report information on such efforts that relates to our six sites.

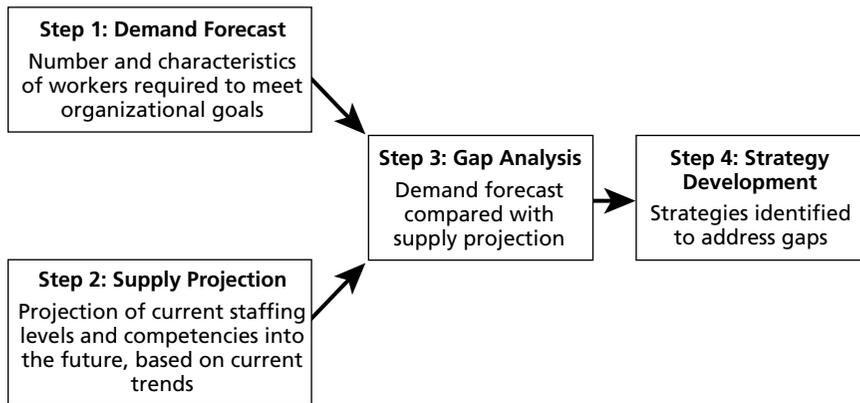
Methodology

In addressing the overall objective of this project, we applied a bottom-up research approach, which reflects the fact that civilian workforce planning in DoD has traditionally been decentralized. The centerpiece of our research effort was site visits at six purposefully selected installations. The site visits were designed to gather information on local workforce-planning efforts. Data collection at the sites was informed by a simple, generic workforce-planning model. In this monograph, we provide a structured description of these local efforts, assess the information on local workforce planning with an eye to identifying opportunities for Department-wide planning efforts, either in support of or as a supplement to local efforts. Additionally, we examine the information available to support Department-wide planning efforts. Finally, we develop recommendations for potential roles for OSD in Department-wide workforce planning.

The Workforce-Planning Framework

Workforce-planning efforts share a common goal of getting “the right number of people with the right skills, experiences, and competencies in the right jobs at the right time” (U.S. Department of Health and Human Services, 1999). Such efforts have proliferated in public- and private-sector organizations in recent years (Crawford, 2001; Emmerichs, Marcum and Robbert, 2004a, 2004b; Ripley, 1995; Sullivan, 2002; Washington State Department of Personnel, 2000). Although specific workforce-planning approaches differ by organization, the workforce-planning process typically involves four steps, as shown in Figure 1.1.

Figure 1.1
Workforce Planning Typically Has Four Steps



RAND MG449-1.1

Step 1 is to forecast demand—i.e., to estimate the staffing levels and competencies required in the future workforce. The term *workforce requirements* is often used to describe the output of the demand forecast. These *requirements* reflect the required number of positions and characteristics that the workers who fill those positions must have in order for the organization to meet its strategic intent. Employee characteristics that are measurable and potentially relevant to the identification of personnel requirements include skills or competencies, occupation/job series, and education. Ideally, an organization will have a model that translates expected workload into workforce requirements (Emmerichs, Marcum, and Robbert, 2004b). The demand forecast should identify the factors that affect workforce requirements and consider how those factors will change in the future. The demand forecast should also consider the impact of technology on workforce demand.

Step 2 (which may be performed in tandem with Step 1) is to project workforce supply. This step involves projecting current staffing levels and competency profiles into the future, based on current trends in hiring, attrition, and retention.

Step 3 brings together the results of Steps 1 and 2 to identify any gaps between supply and demand (recognizing that the supply

estimates are a straightforward projection into the future that assumes no changes in workforce policy). The gap analysis may reveal important differences between the supply projection and demand forecast for particular organizational subunits, particular occupations, or specific competencies.

Step 4 is to develop strategies that address the key gaps.

The model described here captures the key elements of the workforce-planning process, but it is a dramatic simplification of the actual process used in real organizations. One simplification that has important implications for a large, hierarchical organization such as DoD is the omission of issues related to the organizational level at which workforce planning occurs. That level may influence the types of gaps that are identified, as well as the strategies available for addressing those gaps.

Workforce Planning in Large Organizations

Large, complex organizations grapple with the issue of the level at which various workforce-planning tasks should occur² (see Crawford, 2001; U.S. Department of Health and Human Services, 2001; South Carolina Budget and Control Board, 2000; Virginia Department of Human Resource Management, 2003; Washington State Department of Personnel, 2000; U.S. Department of Transportation, 2000; Emmerichs, Marcum, and Robbert, 2004a). The workforce-planning literature indicates that the substantive workforce-planning activities illustrated in Figure 1.1 often occur at the local, or business-unit, level and that business-unit managers should be fully engaged in the process.

Nevertheless, the literature also suggests that “corporate” entities or executives who have oversight over multiple lines of business have a role to play in workforce planning. Emmerichs, Marcum, and

² Coggburn (2005) notes that there is substantial debate regarding the merits of decentralization of human resource functions more generally. This is particularly true in public sector organizations. The author suggests that although decentralization is current in fashion, that reform of public sector organizations tends to be cyclical, reflecting the fact that decentralization has costs as well as benefits. The author finds that among public agencies in Texas, that smaller agencies are more likely to see the benefits of HR centralization.

Robbert (2004a) argue that senior-level executives should play key roles in the workforce-planning process, including ensuring that workforce planning is a key part of an organization's overall strategic planning efforts; leading the effort; and monitoring results of the process.

The possibility of leveraging resources across local organizational boundaries to address gaps provides an argument for corporate-level visibility and review of local efforts. For example, at the Tennessee Valley Authority (TVA), workforce-planning efforts began at the business-unit level in 1991, and an agencywide process was established in 1993 (Ripley, 1995). Corporatwide scrutiny of workforce-planning information allowed the TVA to identify the need for and implement corporatwide responses to shifts in the workforce needs of individual units. "Skill-gap and surplus information projected during the work-force planning process helped Tennessee Valley Authority implement cross-organizational placement and retraining as alternatives to job cutbacks in individual business units" (Ripley, 1995, p. 5).

Another argument for a corporate-level role in workforce planning stems from a recognition that workforce-planning tools are often expensive to develop and maintain. An organization may be better off coordinating the development of such tools across the entire organization. Such coordination can also promote corporate efforts to leverage resources across organizational boundaries by creating data resources required for corporate-level visibility of local efforts. Several state governments have a statewide workforce-planning office or human resources office that plays three key roles: developing and maintaining a data warehouse with information on all state employees; developing and disseminating to state agencies a general workforce-planning methodology; and encouraging and supporting agency workforce-planning efforts as a center of excellence (see Crawford, 2001; U.S. Department of Health and Human Services, 2001; South Carolina Budget and Control Board, 2000; Virginia Department of Human Resource Management, 2003; Washington State Department of Personnel, 2000).

Because DoD is a large and hierarchical organization, we expect these considerations of organizational level to factor into and influence the workforce-planning process.

Site Visits

We conducted site visits at six installations to gather information on local workforce-planning and requirements-determination efforts in DoD. In conjunction with these six site visits, we also met with representatives from three higher-level DoD organizations. The six sites we visited were Dahlgren Naval Surface Warfare Center, Virginia; Tinker Air Force Base, Oklahoma; the Defense Supply Center in Philadelphia (DSCP); Patuxent River Naval Air Warfare Center, Maryland; Norfolk Naval Shipyard (NNSY), Virginia; and Fort Lewis, Washington. In addition to meeting local-level planners, at Dahlgren and Patuxent River, we were able to meet with workforce planners whose purview was workforce planning for the entire Naval Sea Systems (NAVSEA) and Naval Air Systems (NAVAIR) commands. Before conducting our visit at NNSY, we met with a Washington, D.C.–based workforce-planning office with oversight over all DoD naval shipyards.

Our aim in selecting these six sites for in-depth analysis was to visit a variety of installations with different organizational missions and workforce characteristics. The sites were drawn from a variety of services/agencies, including the Army, Navy, Air Force, and Defense Logistics Agency (DLA), and accommodated OSD's specific interest in shipyards and depots as providing an example of more-structured civilian workforce planning. The sites were diverse in the age distribution and occupational characteristics represented in the civilian workforce. Finally, the sites were geographically diverse, located in the Northwest, Midwest, South, and Northeast. The final sample reflects our best efforts to achieve a diverse sample according to the characteristics just discussed. Ultimately, we were limited by the willingness of installations to host a time-intensive site visit. One limitation of our final sample is that a disproportionate number of the sites were Navy installations.

Site-visit research and interviews were guided by the generic workforce-planning framework in Figure 1.1. However, in the data-gathering process, we were sensitive to the limitations of this framework. We sought input from individuals involved in the four key steps of the process. At each site, we asked to speak to representatives from manpower, civilian personnel, resource management, specific functional areas, and other business units involved in workforce planning. In most cases, doing so involved finding a contact at the installation, suggesting to this contact the type of personnel to whom we were interested in talking, and asking the contact to develop an agenda for our visit. Table 1.1 summarizes the types of officials with whom we sought interviews and the general topics to be addressed in each interview. At each site, we were able to meet with at least one individual knowledgeable about each topic, and at most installations, we met with several individuals.

At the time of our visits, several installations were undertaking workforce-planning initiatives. When possible, we met with individuals who played a role in these activities, even if they were not representatives of the offices described in Table 1.1. Special circumstances or programs at specific locations led us to conduct additional interviews with individuals involved in commandwide or activitywide planning efforts, or the program directors for education, training, and development programs.

Our interviews were guided by a semi-structured protocol. We also gave respondents the opportunity to raise important issues that were not addressed in our protocol. All of our discussions were conducted on a nonattributorial basis, so that interviewees could be assured that specific statements would not be tied to them. Nevertheless, interviewees welcomed the opportunity to be acknowledged by name in the Acknowledgments section of the monograph.

Table 1.1
Requested Site-Visit Interviews

Office workforce-planning representative	Interview topics
Manpower office	<ul style="list-style-type: none"> •involvement in installation-level workforce-planning efforts •involvement in functional-level workforce-planning efforts •discussion of trends likely to affect workforce needs •nature of interactions with personnel lists on workforce supply and planning •reporting of civilian requirements to major command, service
Civilian personnel office	<ul style="list-style-type: none"> •involvement in installation-level workforce-planning efforts •discussion of major personnel trends, issues, or concerns on base •recent personnel policies put in place to manage the workforce (e.g., early-retirement initiatives, recruiting drives).
Functional managers	<ul style="list-style-type: none"> •involvement in functional workforce-planning efforts •discussion of major personnel trends, issues, or concerns on base •recent personnel policies put in place to manage the workforce (e.g., early-retirement initiatives, recruiting drives).
Resource management office	<ul style="list-style-type: none"> •involvement in installation-level workforce-planning efforts •involvement in functional-level workforce-planning efforts •discussion of trends likely to affect workforce needs •nature of interactions with personnelists (i.e., formally classifying jobs [giving them a job series and grade level], posting job openings, and screening applicants) on workforce planning •reporting of civilian requirements or Most Efficient Organization (MEO) results to major command, service

A summary of our interview protocol is shown in Table 1.2. The complete interview protocol is provided in Appendix A.

Table 1.2
Site-Visit Protocol

Item	Protocol
Workforce-planning overview	<ul style="list-style-type: none"> •We gave interviewees an overview of workforce planning, describing it as “getting the right number of people with the right set of competencies in the right jobs at the right time.” •We told participants that the workforce-planning process involves creating a demand forecast for the workforce, conducting a supply analysis, performing a gap analysis, and developing a strategy for addressing gaps. •We then asked interviewees to describe current workforce-planning efforts and the data used for such activities.
Strategic planning and workforce planning	<ul style="list-style-type: none"> •We asked interviewees to describe any strategic plan that influences the activities of the organization, and to specify any strategic objectives that affect workforce planning. •We also asked what workforce characteristics or occupations are particularly important in view of the strategic plan.
Supply analysis	<ul style="list-style-type: none"> •We asked interviewees to describe the extent to which they monitor the composition of the civilian workforce, and what workforce characteristics are considered. •We also asked them to describe workforce-projection activities conducted by the organization, if any.
Demand analysis	<ul style="list-style-type: none"> •We asked interviewees to describe the extent to which they project the composition of the civilian workforce that will be needed in the future and to describe that process.
Gap analysis	<ul style="list-style-type: none"> •We asked interviewees to describe the extent to which their organization compares supply-and-demand projections, and what strategies are used in the event that a gap between the two is identified.
Use of workforce-planning information	<ul style="list-style-type: none"> •We asked interviewees to describe the extent to which the workforce-planning information discussed is used by their organization and by other entities within DoD. •We also gave respondents an open-ended opportunity to raise important issues that we had not touched upon.

The basic workforce-planning model also provided a guide for the write-up of the interview results. Insights from the site visits are summarized topically in Chapter Two.

Review of Data Sources to Support Department-Wide Efforts

To evaluate the feasibility of a Department-wide role in workforce planning, we reviewed several potential sources of data that could support different stages of DoD-wide workforce planning. We examined data on DoD's civil service workforce from the Defense Manpower Data Center (DMDC) to assess the potential usefulness of these data for workforce planning and for examining workforce trends. We obtained data from two separate DMDC files: the Civilian Personnel Master File and the Transaction File. The master file provides snapshots of the DoD civilian workforce taken at the end of each fiscal year. The transaction file provides updates on personnel transactions, such as promotions, transfers, and separations. Individuals are identified by a unique record number in each file and each year. We used this unique identifier to link files, creating a rich longitudinal database of career histories. Data were available for the years 1987 through 2003.³

We also examined whether Manpower Estimates Reports (MERs), submitted as part of the review process for major acquisition programs, might provide a useful source of data for workforce-planning efforts. To obtain additional background information on the way in which personnel-requirements estimates are developed for those reports, we reviewed the documentation for current major acquisition programs and interviewed officials involved in developing those reports.

Organization of the Monograph

Chapter Two summarizes the results from our site visits—specifically, the approaches and data sources used for workforce planning at DoD installations—and identifies local challenges or barriers to planning efforts at this level. In Chapter Three, we examine existing data sources and assess the extent to which these sources would support

³ The payroll file data are available from 1995 on.

Department-wide civilian workforce-planning efforts or initiatives to support local efforts. Chapter Four provides conclusions and policy recommendations on DoD-wide workforce planning and requirements determination. Appendix A contains our site-visit interview protocol, and Appendix B provides examples of the types of analyses that can be performed using DMDC data on the civilian workforce.

Local Workforce-Planning Efforts

In this chapter, we describe data sources and workforce-planning approaches that are used at the local level in DoD. This summary is based on information collected in interviews with individuals involved in civilian workforce planning and six DoD installations that we chose in consultation with OSD officials from among the 30 largest employers of DoD civilians. This chapter describes supply analysis, demand analysis, and gap analysis efforts, and the strategies for addressing those gaps that we observed at these sites.

Overview of Sites Visited

Table 2.1 provides an overview of workforce characteristics for each of the sites we visited. The bottom row (SEA 04X) shows characteristics for the four shipyards combined. The sites are diverse in geographic location, median age, and median years of service. The sites were also drawn from different parts of the DoD (Army, Navy, Air Force, Defense Logistics Agency [DLA]), and they vary by distribution of occupations and type of work performed.¹

Figure 2.1 summarizes the distribution of occupations within the six sites that we visited. For ease of exposition, we group

¹ Appendix B provides information on size, median years of service, and median age for the largest DoD installations, for comparison.

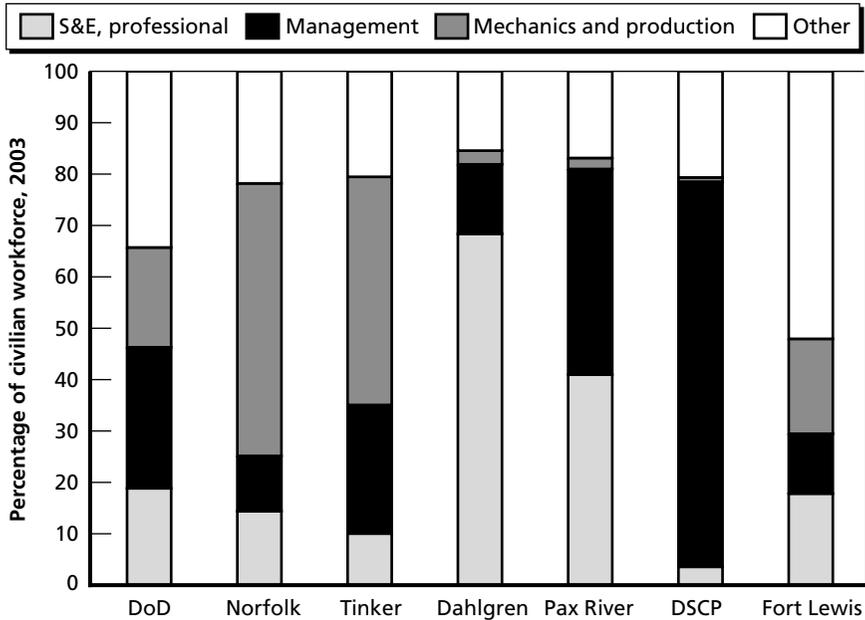
Table 2.1
Characteristics of Sites Visited

Site	Description	Three largest occupations (percentage of civilian workforce)	Main function	Size	Median years of service	Median age (years)
Dahlgren	Naval Surface Warfare Center	Engineers (33%) Miscellaneous Professional (17%) Mathematicians (10%)	Research and Development	4,177	15	42
DSCP	Supply Distributor	Logistics Management (45%) Central Management (18%) Logistics Technicians (8%)	Supply Distribution	4,295	22	48
Fort Lewis	Army Base	Medical Professionals (12%) Miscellaneous Clerical (10%) Medical Technicians (10%)	Garrison, Medical Facility	4,591	15	48
Patuxent River	Naval Air Warfare Center, Aircraft Division	Engineers (33%) Central Management (18%) Logistics Management (13%)	Research and Development	7,011	16	44
Norfolk	Naval Shipyard	Vehicle Operators (13%) Engineers (13%) Metal Workers (13%)	Ship Repair and Maintenance	8,277	22	47
Tinker	Air Force Base; Air Craft Depot	Aircraft Mechanics (15%) Logistics Management (13%) Metal Workers (11%)	Air Craft Repair and Maintenance	15,525	18	46
SEA 04X ^a	Headquarters, Shipyard Workforce Planning	Vehicle Operators (15%) Engineers (14%) Metal Workers (11%)	Ship Repair and Maintenance	27,391	22	47

SOURCE: Authors' calculations based on Civilian Personnel Master File data from DMDC.

^a This row combines the workforce characteristics of the four naval shipyards.

Figure 2.1
Occupational Characteristics of DoD and Specific Sites



RAND MG449-2.1

Functional Occupational Groups into four broad categories: (1) science and engineering (S&E), and professional, (2) management, (3) mechanics and production, and (4) “other.”² The last (fourth) category encompasses clerical workers, technicians, fire and police, and several other miscellaneous occupations. As Figure 2.1 shows, the sites that we visited had diverse occupational compositions. Relative to the DoD as a whole (shown in the column on the far left), Norfolk Naval Shipyard (Norfolk) and Tinker Air Force Base have a larger percentage of mechanics and production workers. In contrast, Dahlgren and Patuxent (Pax) River have highly professional workforces; almost 70 percent of Dahlgren civilian employees and 40 percent of Patuxent River’s employees are involved

² The occupation groups shown in this graph are based on the first digit of the Functional Occupational Group code in the DMDC data.

in science, engineering, and other professional occupations. DSCP has a high proportion of management workers, including logistics management, personnel management, central management, and financial services. Fort Lewis, which has a high percentage of “other” workers, employs many clerical workers (21.6 percent of the civilian workforce) and technicians (18.9 percent of the workforce).

Below, we briefly describe each of the sites visited. The information provided here will be relevant to our discussion of the sites’ workforce-planning efforts.

Dahlgren Naval Surface Warfare Center

Dahlgren, the smallest site that we visited, is one part of the Naval Surface Warfare Center (NSWC), under the Naval Sea Systems Command (NAVSEA). NSWC Dahlgren Division (DD) comprises three major sites. Dahlgren is by far the largest of these. The primary focus at Dahlgren is research and development, and engineers and other professional workers are heavily represented in Dahlgren’s workforce. In addition to meeting local managers at Dahlgren, we also had the opportunity to discuss workforce planning with a representative from NAVSEA.

Workforce planning at Dahlgren is conducted both at the local level (under the direction of business, operations, and human resources managers in DD), and at the command (NAVSEA) level. The two levels take different approaches to workforce planning. At the local level, workforce planning is based primarily on strategic and managerial insight, with supporting input from analyses of Defense Civilian Personnel Data System (DCPDS) data. Local managers reported that the information in DCPDS often lacks sufficient detail, particularly on required skills and workforce competencies, to be useful for supply-and-demand analysis. NAVSEA has spearheaded several commandwide initiatives to collect better data on skills and competencies. In 2004, NAVSEA re-aligned its organizational structure according to 12 product areas, and the product area directors (PADs) are tasked with leading workforce-planning efforts.

Defense Supply Center–Philadelphia

The Defense Supply Center in Philadelphia (DSCP), which is part of the Defense Logistics Agency (DLA), provides clothing, textiles, pharmaceuticals, medical supplies, and general industrial items to the DoD and to such non-DoD government agencies as the National School Lunch Program (NSLP; <http://www.fns.usda.gov/cnd/Lunch/default.htm>). In 2003, its largest client was the Army. Most human resource (HR) personnel for DLA are centralized in Columbus, Ohio, but DSCP has its own HR representative because of the relatively large number of employees at the location. Although headquartered in Philadelphia, DSCP also has regional command offices in Europe (Germany, Denmark, Italy, England) and the Pacific (Hawaii, Korea, Japan, Guam). In addition, there are a few small field offices scattered throughout the United States.

In the 1990s, both a Base Realignment and Closure (BRAC) action and a reduction in force (RIF) caused staffing to be cut substantially, and DSCP was consolidated with a related DLA activity in northeast Philadelphia. In the late 1990s, civilian personnel functions across the three supply centers were centralized. Despite this centralization, workforce planning is primarily left to the local installations.

Fort Lewis

Fort Lewis, the only Army installation in the study, is the only site we visited that had a predominantly military presence. Fort Lewis has two main functions. It houses “1st Corps,” an Army power-projection platform, and Madigan Army Medical Center (MAMC), a military treatment facility. Part of the civilian labor force at Fort Lewis is thus employed to support the large Army presence; an additional segment is composed of medical professionals and medical support personnel. At the time we visited, in fall 2004, MAMC was facing a challenge: Much of its military staff was deployed in Iraq, and the facility was having trouble finding civilians and Reservists to fill the gap.

Workforce-planning efforts at Fort Lewis are specific to particular funding-related segments of the workforce. For non-appropriated fund (NAF) activities, workforce planning occurs in

conjunction with the development of the budget. NAF activities have to take in enough revenue through user fees to afford the positions, so standards and requirements are considered in conjunction with resources.

Appropriated fund (APF) activities consider the number of people needed to do the work but are constrained in their workforce planning by the number of authorized and budgeted work years. Working Capital Fund (WCF) activities (e.g., information services, depot maintenance), by contrast, provide goods and services on a reimbursable basis to other entities within DoD (and for authorized non-DoD entities). (See <http://www.dod.mil/comptroller/icenter/dwcf/busareas.htm>.) As a result, workforce planning in WCF activities should carefully consider customer demand. Nevertheless, a senior administrator within the civilian personnel office did not feel that workforce-planning responsibilities were appreciably different across APF or WCF.

Specific workforce-planning activities conducted at Fort Lewis include Madigan Army Medical Center's (MAMC's) Automated Staffing Assessment Model (ASAM) III forecasting model and "mini" manpower studies conducted by the garrison.

Patuxent River Naval Air Warfare Center Aircraft Division

Patuxent River hosts the Naval Air Warfare Center Aircraft Division (NAWCAD), under Naval Air Systems Command (NAVAIR). As at Dahlgren, the workforce at Patuxent River is highly technical; one-third of civilian workers are engineers. Patuxent River is unique among the localities we visited in that it houses the Human Resources Offices for both the local NAWCAD and for NAVAIR Headquarters. Thus, we were able to get both local and systemwide perspectives on workforce planning during our visit.

At the local level, NAWCAD is in the early stages of developing an advanced workforce-planning model. Current hiring at Patuxent River is based on monthly or annual needs that are articulated by functional managers, and requirements estimates are based on prior-year hiring. Currently, no systematic methodology underlies these estimates; however, NAWCAD is attempting to become more

strategic. When we visited, senior leaders at NAWCAD were developing a workforce-shaping survey.

NAVAIR is developing a human-capital strategic approach to workforce planning that it expects to increase productivity. Part of this approach involves a coordinated effort to collect data on skills and competencies across installations within NAVAIR. The efforts under way at NAVAIR echoed the efforts discussed at Dahlgren/NAVSEA.

Norfolk Naval Shipyard

Norfolk Naval Shipyard (NNSY) maintains, modernizes, and provides emergency repair services for U.S. naval ships. Over half of Norfolk's workforce is employed in mechanics and production occupations. Workforce planning at NNSY is heavily influenced by the Corporate Production Resources Team (CPRT). The CPRT comprises mid-level resources managers from all four of the public shipyards, plus a representative from D.C.-based headquarters (SEA 04X), another site we visited. The team is responsible for detailed workload and staffing projections for all four of the naval shipyards. The size of the workforce at the naval shipyards diminished considerably during the 1990s, from 80,000 employees in the early 1980s to 25,000 employees in 2004. As a result, there is more reliance on the private sector.

Under the "One Shipyard" concept, coordination occurs across the four public shipyards, and—in some cases—this coordination extends to the private shipyards (particularly Northrop Grumman Newport News Shipyard and General Dynamics Electric Boat).

To conduct workforce planning, the shipyards must understand the Navy's Fleet Response Plan (determined by the flag review panel), which defines the Navy's mission. The workforce plan for the shipyards begins with the Fleet Response Plan, and the shipyard's repair workload then flows from that plan. An administrator at SEA-04X is the single point of contact between operations (customer organizations) and maintenance (the shipyards). He attends the fleet-scheduling conference and tries to balance the needs of the fleet and the availability of the shipyard.

Tinker Air Force Base

Tinker AFB is the single-largest employer of DoD civilians among all DoD installations. Tinker is also one of the largest civilian employers in the state of Oklahoma. Tinker AFB houses the Oklahoma City Air Logistics Center (OC-ALC), one of three depot repair centers in Air Force Materiel Command (AFMC). Another key organization at Tinker is the 72nd Air Base Wing. Tenant organizations (i.e., organizations that are housed at a particular installation but are not officially part of the chain of command that sponsors or funds the installation) at Tinker include the 552 Air Control Wing (ACW) (part of Air Combat Command), the Defense Information Systems Agency (DISA), the Defense Logistics Agency, and Navy units. Within the OC-ALC, civilians make up over 90 percent of the workforce. About 14,000 civilians work on base, and about 13,000 of those are at the ALC.

Formally, workforce-planning efforts at Tinker are separate from those at other ALCs, such as Warner-Robins or Hill AFB. However, Tinker does not operate in a vacuum, and workforce planners are in constant contact with their counterparts at other installations.

There are few formal relationships across tenant organizations within Tinker, although—as a courtesy—Tinker oversees workforce planning for the 552 ACW. Tinker will also work with tenant organizations on personnel issues in certain circumstances. For example, DISA is going through a downsizing, and Tinker’s directorate of personnel (DP) is planning to absorb some of the workers so that people do not have to be let go.

Key Findings from Site Visits

In this section, we discuss findings from our site visits. The discussion is structured around five key topics:

- overview of workforce planning
- supply analysis
- demand analysis
- gap analysis
- strategies for addressing gaps.

Each Installation Conducts Workforce Planning to Some Degree

Each of the installations that we visited conducts workforce planning, although the methodologies employed vary considerably across sites. For example, the shipyards develop monthly Workload Allocation and Resource Reports (WARR), which contain estimates of workforce requirements that can be disaggregated to the shop or product level. The WARR can be compared to worker-supply forecasts developed through an integrated hiring plan, which projects future staffing patterns. By comparing the WARR to the integrated hiring plan, the shipyards can perform a gap analysis that closely parallels the model outlined in Chapter One. After identifying gaps, the shipyards have a variety of tactics that they utilize to calibrate the workforce, including borrow-and-loan programs (discussed in Figure 2.3), the use of contract labor, incentivized retirement, and apprenticeship programs for attracting new personnel.

Other installations take a less-formal approach to workforce planning. Hiring at the Patuxent River NAWCAD is based on monthly or annual needs articulated by functional managers, who rely primarily on managerial insight in order to generate such estimates. Some functional managers keep detailed spreadsheets of worker characteristics in order to estimate needs; others rely on rules of thumb or managerial insight. Although Patuxent River is attempting to become more strategic in its workforce-planning approach, the lack of a formalized methodology does not necessarily imply that it is doing a poor job of workforce planning. One of the lessons that we learned during our visits is that formalized data-gathering processes can be costly, and that some sites have experienced failed workforce-planning initiatives in the past. Further, systematic data-collection and forecasting methodologies may work better for some workforces than for others.

Our site visits revealed that the “installation” is not the only, or even the most relevant, unit of analysis for workforce planning. At some installations, separate projections are developed for individual occupations or business units. For example, managers at Madigan Army Medical Center have developed workforce-planning tools that are specific to the medical community and are not applied elsewhere at Fort Lewis. At other installations, projections are developed separately for particular occupations, such as engineers and production workers. Typically, the civilian personnel office for the installation uses input from the units to develop requirements forecasts for the installation as a whole. However, in some cases, installation managers may develop installation-level projections and then disaggregate them to the occupational or business-unit level. The shipyards take a very-high-level approach for some projections, but they have the ability to drill down (i.e., to disaggregate the data in various ways) to look at specific products, shops, and—eventually—skills.

At many installations, there are separate workforce-planning processes for Working Capital, appropriated fund, and non-appropriated fund activities that reflect the fact that these activities face different budgeting constraints. Working Capital Fund (WCF) entities need to be fairly careful in projecting requirements so that they can provide realistic cost estimates to their customers. In contrast, APF activities may be more constrained by authorized and budgeted work years. In most cases, workforce planning for tenant organizations is done by the parent organization, rather than by the installation at which the tenant is located.

Finally, the relationship between local-level workforce planning and command- or service-level initiatives varies across DoD. All the Navy sites that we visited discussed the Navy’s Human Capital Strategic Plan (a service-wide plan for the use of human resources), although the NAVSEA and NAVAIR systems commands placed a greater emphasis on this initiative than did the local installations or the shipyards. In contrast, workforce planners at Fort Lewis did not discuss Army-wide workforce-planning initiatives. Similarly, although the personnel office for DSCP is regionalized at a DLA office in

Columbus, Ohio, workforce planning is the responsibility of the local installation.

Local Supply Analysis Is Based on Defense Civilian Personnel Data System Data

Installations generally focus on the characteristics of the current workforce when creating estimates of workforce supply. Most often, information on the existing workforce is supplemented by information on expected attrition; less often, it is supplemented with information on potential new hires.

At each location, those involved in workforce planning, including civilian personnel office staff and functional managers, make use of civilian personnel data to profile and monitor the characteristics of their existing workforce. The level of detail available and used for these purposes varies by location, but all managers track salient characteristics of the workforce as a whole³ and of relevant subsets of the workforce, such as occupation or occupational group. In most cases, data used for supply analysis purposes comes from the Defense Civilian Personnel Data System, which includes basic demographic information about personnel, as well as information about the positions the personnel hold.⁴ However, some locations have access to more-detailed information on the skills required by certain positions because their service, command, or local installation supplements the basic DCPDS data. For example, the Air Force legacy system⁵ in-

³ For example, grade level, occupational series, and experience. Most civilian federal positions are classified or assigned to position titles, numerical occupational codes, series, and grades, according to standard sets of criteria, governed by OPM. The two main classification systems of the federal government are the General Schedule (GS) system and the Federal Wage System (FWS)—although there are many others. Within each classification system, grade-level distinctions reflect differences in duties, responsibilities, and qualification requirements. These distinctions vary by system and by occupation.

⁴ The types of data available and analyses that are possible using DCPDS data are illustrated in Chapter Three and Appendix B.

⁵ Before the implementation of the DoD-wide DCPDS, each service maintained its own personnel data system. These systems are referred to as *legacy systems*. The Air Force legacy system was also called DCPDS, so we refer to it here as the *Air Force legacy system* to avoid confusion.

cludes information on skills. Also, Norfolk Naval Shipyard has developed an integrated hiring plan that allows it to project worker supply at the shipyard, shop, and project levels.

All sites use personnel data to project workforce supply at an aggregated level (e.g., installationwide), but there is variation in the degree to which these projections are disaggregated. Tinker AFB breaks projections down by occupational series and has the potential to disaggregate even further, using the Air Force legacy data system. At the naval shipyards, supply projections are made at the shipyard, shop, and project levels, and workforce managers anticipate being able to disaggregate the data even further in the near future (see Figure 2.3 later in this chapter). The average age of the workforce and the percentage of employees who are eligible for retirement are particularly salient characteristics to managers at all locations. At several locations, managers make projections of workforce turnover based on historical trends and the current characteristics of the workforce. These projections account for different rates of turnover by employee age, occupation, and other characteristics. Overall, managers who conducted such analyses relied on locally developed tools to do so.

Although they make wide use of the DCPDS data to track workforce characteristics, some managers were quick to note the limitations of DCPDS. Demographic characteristics and general occupational categories reveal limited information about the workforce. Several managers noted that it would be useful to know more about the competencies or specific skills possessed by their employees. Nevertheless, at Tinker AFB, where skills codes are available in the service legacy system, one executive told us that job series and grade level are the most important characteristics to consider when making projections. Figure 2.2 provides an example of an effort to develop a skills database by NAVAIR.

Figure 2.2
NAVAIR's Skills Database

In fall 2003, NAVAIR began two data-collection efforts: one to assess worker project experience and a second to catalog skills possessed by organizations. In the first effort, civilian and military workers identified the products they support, the tasks they perform, and the percentage of time they spend on each product, using a pull-down menu available online. Before submitting the forms, workers were asked to have their responses verified by supervisors. Verification was done on a “good-faith” basis, without a formal requirement for supervisor review. NAVAIR plans to field this survey again, possibly adding more questions. Ultimately, NAVAIR hopes to introduce more accountability into the response system by linking responses to performance evaluations and self-development goals.

NAVAIR's second initiative asked supervisors to describe the skills possessed by their employees. These skills were quantified at the organizational-code level, which represents a branch of workers within a department grouped by functionality. For example, an organizational code might represent a group of engineers who support a particular product. The survey was free-form, meaning that managers described the job skills associated with each organizational code in prose. Although managers were asked to describe each skill using a sentence that began with either “This skill requires knowledge of . . . ,” “This skill requires the ability to . . . ,” or “This skill requires expertise in . . . ,” few respondents followed this instruction carefully. In future data-collection efforts, NAVAIR may make this format mandatory by starting the sentences in a Web form and asking respondents to fill in the blanks.

The first round of data collection from the supervisor survey yielded 23,000 skills codes. To ensure that each skills code was unique, NAVAIR convened experts with relevant technical backgrounds to adjudicate the responses. Skills codes that appeared to be similar were flagged, and the panel then determined whether (1) the responses described the

Figure 2.2
Continued

same skill and could be consolidated or (2) the responses reflected different skills and the wording of the descriptions needed to be changed in order to differentiate between the two. Although the process took months, NAVAIR eventually reduced the number of skills codes from 23,000 to between 9,000 and 10,000. As of fall 2004, there are no plans to further condense the codes.

Both the skills-codes data and the product-support survey were motivated partly by NAVAIR's desire to create a more flexible internal labor market. Knowing more about worker skills and product experience allows managers to redistribute workers or workload to fill gaps and shortages as they arise. While this type of redistribution could potentially involve moving workers across installations, a more typical scenario would involve moving work within a location. Further, NAVAIR is currently planning to reduce the size of the civilian workforce, and data on skills and project experience may help the organization target Voluntary Early Retirement Authorization (VERA) and Voluntary Separation Incentive Payments (VSIPs) toward individuals whose skills are no longer needed or are in excess supply.

Although the individual survey on project experience and the supervisor survey of worker skills were fielded at roughly the same time, they were not specifically linked. According to one of our NAVAIR contacts, the near-simultaneous timing of the surveys was more a function of the "maturation of a philosophy" than a conscious desire to conduct the surveys in tandem. NAVAIR eventually plans to field a third survey that will ask individual workers to describe their own skills, using managers' responses from the earlier survey as a template. Individuals will be asked to identify the skills they possess among those skills reported in their occupational code. Respondents will also be asked to rank their proficiency in each skill (e.g., beginning, intermediate, advanced) and to describe whether they have made use of each skill in the recent past.

Approaches to Demand Analysis Vary Widely Across Installations

Whereas supply analyses are mainly inventory-projection models that rely primarily, if not exclusively, on DCPDS or related databases maintained by services and locations, demand analyses make use of a wide variety of information, methodologies, and data sources. Customer projections of demand for particular goods or services are a natural source of information. In addition to this information, managers use historical information to help translate customer-workload measures into workforce projections. Such information may be obtained from electronic timekeeping systems, workload management systems, and the like.

Our site visits revealed that the data available to managers for demand analysis vary dramatically according to the activity under consideration. Some activities, such as shipyard maintenance work, have elaborate data systems maintaining projected workload information that supports demand-analysis efforts. Overall, it appears that some activities, particularly those involving work that is more systematic and repetitive, are more amenable to, and can benefit more from, systematic data collection.

Not surprisingly, the level of detail in demand forecasts varied widely across the installations that we visited. For example, Madigan Army Medical Center uses a sophisticated demand-projection model based on the population size and age distribution of eligible beneficiaries in its catchment area. By analyzing historical utilization patterns, MAMC determines how many physicians, nurses, and other personnel are required to provide care to individuals (adjusting for factors such as age and gender). These provider ratios are then multiplied by the expected population of beneficiaries.

The shipyards develop forecasts based on historical experience, and they can disaggregate these forecasts by shop, project, or product. At other installations, forecasts are based on prior-year hiring or on subjective input from managers. Regardless of the tool used, managers emphasize that the accuracy of demand forecasts is limited by uncertainties about demand and budget, the availability and reliability of labor standards, and workforce limitations.

A related point is that workforce projections tend to be more accurate at higher levels of aggregation. In other words, it is easier to project workload at the installation or command level than at the project or occupation level. This difference owes to the smoothing out of some demand uncertainties in the aggregate—for example, the installation might overestimate the need for painters and underestimate the need for welders, but the total projected person-days are accurate.

The simple workforce-planning model described in Chapter One presents demand analysis as a relatively straightforward process, in which planners identify what customer demand is and determine the labor required to meet that demand. Assumptions that are implicit in such a straightforward model are that (1) it is possible to construct accurate measures of customer demand, (2) the organization has a mechanism for translating customer demand into an estimate of the workforce required to get the job done, and (3) those translated requirements determine workforce demand. Our site-visit interviews raise questions about the validity of those assumptions for workforce planning at local DoD installations.

Workforce Demand Estimates Are Only as Good as Customer Demand Estimates. Ultimately, the accuracy of workforce-demand estimates is limited by the precision of customer-demand estimates. At many of our site visits, we found examples of situations in which customer demand deviated from expectations. For example, after the events of September 11, 2001, and the subsequent anthrax attacks, Dahlgren faced an unexpected increase in demand for employees with chemical and biological expertise. Prior to September 11, 2001, such personnel had been constantly targeted for cuts. Similarly, since the start of the war in Iraq, Tinker AFB has had fewer aircraft in depot but a greater need for engine maintenance. Other unanticipated events include budget cuts and changes in plans to retire an existing asset or procure a new asset. Figure 2.3 provides a detailed description of the difficulties in estimating customer demand at the naval shipyards and the strategies for dealing with these difficulties.

Figure 2.3
Response to Changes in Workload—Churn—at the Naval Shipyards:
The Corporate Production Resources Team

At the shipyards, changes in workload, referred to as “churn,” are particularly common. One of our contacts at SEA 04X—a commandwide (NAVSEA) organization that oversees the naval shipyards—provided us with a historical “churn chart” (Figure 2.4, below) illustrating the magnitude of changes in the demand for submarine repair and maintenance. Each column in the chart reflects actual or projected workload, by shipyard and fiscal year, at a particular point in time. If projects evolved as initially anticipated, the columns of the chart would be identical at all four points in time. However, due to churn, it is common for projects to be moved or rescheduled. The chart is difficult to read; however, its general message is conveyed by the complex system of arrows, which indicates that scheduling changes are common.

The arrows in this chart flag projects that either moved from shipyard to shipyard or experienced delays. For example, the first arrow in the upper-left-hand portion of the diagram indicates that the “SSN 715 Engineering Refueling Overhaul (ERO),” which was originally scheduled to be done at Portsmouth Naval Shipyard in FY03, was moved to Pearl Harbor to be started in FY02.

Delays or changes at the shipyards can reverberate throughout the system. According to planners at SEA-04X, when the USS *Carl Vinson’s* refueling/complex overhaul (RCOH) was delayed, a workload shortage developed at Northrop Grumman Newport News Shipbuilding (NGNN). To help NGNN fill this gap, a large project was diverted from Norfolk Naval Shipyard (NNSY), which then had to fill its own gap with additional work. Such unexpected changes tax an organization’s ability to efficiently manage the workforce—particularly at the shipyards, at which the specialized nature of the work and security-clearance requirements make it difficult to quickly hire the appropriate mix of workers.

Partly in response to these episodes of churn, the naval shipyards established the Corporate Production Resources Team (CPRT), a group of mid-level resource managers from each of the four naval shipyards that

Figure 2.3
Continued

is chaired by a representative from SEA-04X. The CPRT is responsible for detailed workload and staffing projections for the naval shipyards, allowing visibility of workforce planning to be aligned across the shipyards. The CPRT also spearheaded the “One Shipyard” initiative, integrating workforce management across the four public shipyards, two private nuclear shipyards (NGNN and General Dynamics Electric Boat Company), and—where possible—other private shipyards.

As a strategy to address churn, the CPRT introduced a borrow-and-loan program, which allows busier shipyards to borrow workers from slower shipyards when resources are available. The borrowing shipyard must coordinate the loan from the lending shipyard, then pay airfare, boarding, and per diem for the borrowed workers. Unions agreed to the borrow-and-loan program with the provision that the shipyards keep a list of willing employees, and that they attempt to use volunteers before mandating employee travel. In practice, the shipyards have found that it is relatively easy to find volunteers for the borrow-and-loan program, as long as there is significant overtime pay offered by the borrowing shipyard. Currently, all four of the public shipyards, as well as the two private nuclear shipyards, participate in the borrow-and-loan program.

The CPRT is also supervising the development of a data system that will catalog worker skills. In contrast to skills codes, which have been used by shipyards in the past, the new system—which involves a broadly defined “tradeskill” and a more narrowly defined “tradeskill designator (TSD)” —will be standardized across all four of the public shipyards. The tradeskills will also be common across shops (i.e., organizational units within a particular shipyard; formerly, different shops might use different skills definitions), so that a painter in one shop will have the same tradeskill as a painter with similar skills in another shop. Each individual can be assigned a primary tradeskill, a secondary tradeskill, and multiple TSDs.

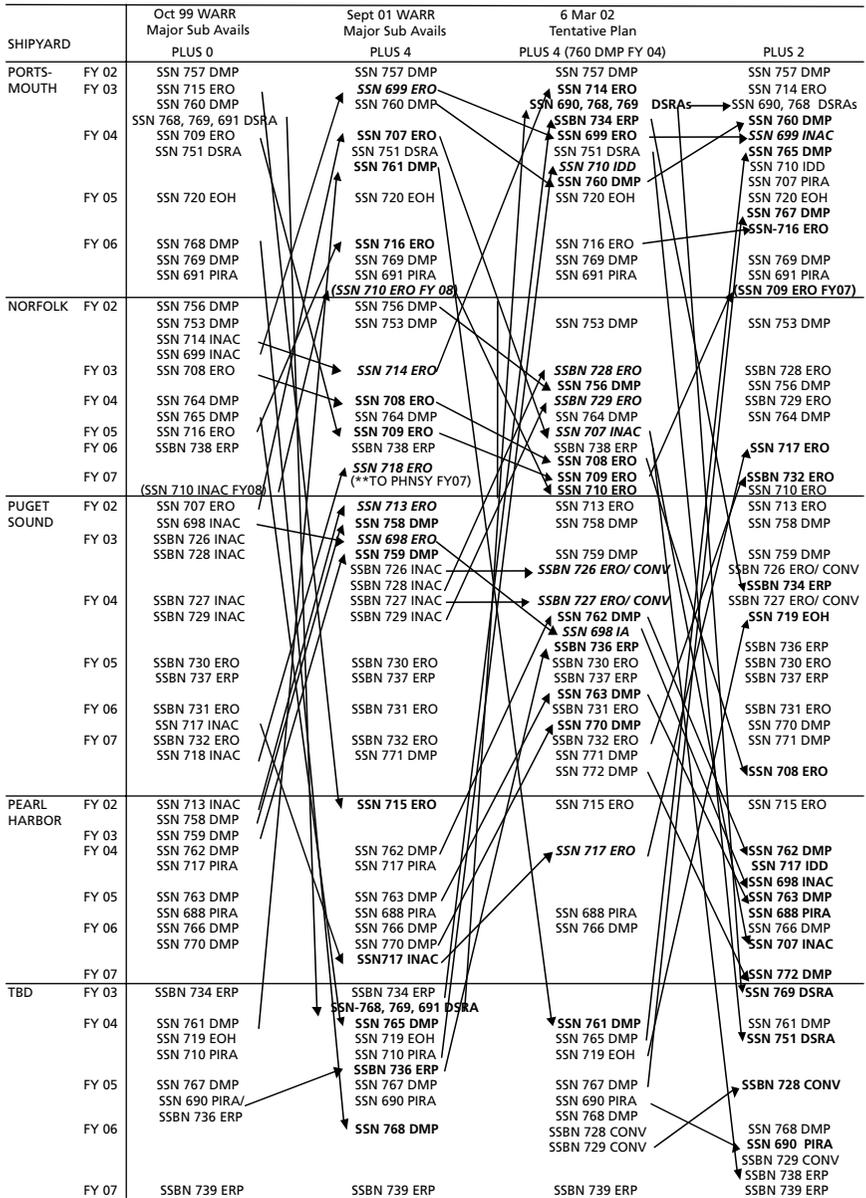
Figure 2.3
Continued

Although the tradeskills and TSDs are standardized across shipyards, each shipyard may have a different mix of tradeskills and TSDs. Currently, Norfolk Naval Shipyard has 17 tradeskills and 117 TSDs represented in its labor force. Table 2.2 gives some examples of TSDs for the “painting and blasting” tradeskill (PT). The next generation of workforce-planning tools will estimate current and future requirements at the tradeskill level. In addition to their usefulness for forecasting requirements, the TSDs also facilitate the borrow-and-loan program. Specifically, managers can use tradeskills and TSDs to identify workers with particular skills who could be borrowed from other shipyards when needs arise.

Locations Vary in Their Ability to Translate Customer Demand into Workforce Requirements. Pinning down customer demand is only one of the challenges in demand analysis. Another is translating customer demand into workforce requirements. Labor standards are estimates of the number of workers it takes to complete a specific task, and they are usually based on historical data. The accuracy of these standards can vary, particularly if diverse skill levels are required. Not all installations and activities we visited apply labor standards to determine civilian workforce requirements.

Labor standards may be better suited to certain occupations or tasks than to others. We observed the use of standards within the directorate of maintenance at Tinker AFB and also at the naval shipyards. Generally speaking, a large base of workers in a particular area is required to create labor standards; therefore, labor standards cannot be developed for every activity. DSCP is in the process of developing labor standards, but these are new, and their accuracy has not yet been tested. If a task is performed regularly and requires a highly

Figure 2.4
Churn Chart for Naval Shipyards



Bold Italic = Available type change **Bold** = All other changes

Table 2.2
Tradeskill Designators (TSDs) for the Painting and Blasting (PT) Tradeskill

Tradeskill	TSD	Title	Description
PT	AT	Tile setting	Install deck tile, ceramic tile, epoxies, and ablative tile
PT	AP	Painting	Apply and remove paint coatings on ships and non-nuclear components
PT	AB	Abrasive blasting	Prepare nuclear and non-nuclear metal surfaces for preservation
PT	NW	Nuclear paintings	Apply/remove paint coatings in or on nuclear spaces

structured set of skills, labor standards may work well. At NNSY, one interviewee stated that, “a welder is a welder is a welder.”

Similarly, MAMC is able to make reasonably good forecasts of demand for health care services based on the age distribution of the beneficiary population. In contrast, for tasks such as research and development, it may be impossible to predict the number of person-days needed to achieve a particular goal. At Dahlgren, we heard the comment that “a systems engineer is not a systems engineer” (i.e., the context of the work they do matters). Labor standards may be of less use for new projects, for which there is no historical experience from which to draw, or for overhead and management tasks. It is very difficult to apply a time standard to writing a letter or performing an analysis.

In general, our interviews suggested that labor standards are most applicable for production-oriented tasks or tasks for which there is reliable historical experience. Overhead functions and research and development functions may be less amenable to labor standards.

At the Installation Level, Budget and Authorizations May Constrain Workforce Demand. Regardless of whether workforce planners have a scientific mechanism for translating customer demand into estimates of workload and workforce demand, local workforce planners must consider other constraints in the workforce-planning process.

Many organizations face constraints on the number of authorized work years, irrespective of workload. Managers may rationally believe that efforts to estimate workload are less important than efforts directed toward meeting the current budget. Many of the managers with whom we met indicated that workforce requirements are always greater than authorized work years, which are, in turn, greater than funded work years. In other words, organizations receive less funding for civilian work years than they “need” to do everything they are supposed to be doing, so the real workforce-planning challenge that managers face is to figure out how to do as much as they can with the available workforce.

Limits on the number of funded work years are often due to general pressures placed on the organization to improve efficiency or to apply budget cuts in an across-the-board manner, regardless of any consideration of the requirements.⁶ For example, until recently, DSCP’s program objective memorandum (POM) built in an assumption of 4-percent productivity growth, meaning a reduction in Full-Time Equivalents (FTEs). But the 4-percent growth figure was “taken as given” from headquarters and did not necessarily reflect measured increases in productivity. A similar observation was made at Tinker, particularly for the APF activity at the installation.

Although arbitrary budget cuts or productivity increases are often applied to activities for which there is little understanding of the relationship between customer demand and workload, they can also be applied to activities for which there is an accepted workload model. At Fort Lewis, personnel both at MAMC and 1st Corps raised concerns over the fact that funded authorizations do not reflect projected workload. For example, although MAMC has a sophisticated model that forecasts demand based on the projected population of DoD beneficiaries, additional requirements do not necessarily translate into additional funding. Even when funding is forthcoming, positions may go unfilled as a result of salary constraints or lack of quali-

⁶ It should be noted that there may be a chicken-and-egg problem here in the sense that budget cuts may be applied in an arbitrary manner because there are no credible, objective measures of workforce requirements available.

fied applicants. To the extent that the budgetary realities trump workload estimates, installations may not see the value of developing a requirements-projection model.

DoD Installations Identify Workforce Gaps

Managers identify potential gaps by constructing projections based on historical data and looking for occupations or skills that are experiencing unusually high attrition or are projected to experience increased retirement rates. Managers may also focus on skills for which they perceive a recent increase in demand because of changes in characteristics of customer demand. For example, Dahlgren has recently seen a need for more hard scientists (i.e., physicists, chemists, materials scientists), so hiring of hard scientists has become a priority. Ideally, gaps are identified through a comparison of supply-and-demand projections, supplemented by managerial insight.

Although the workforce-planning models discussed in Chapter One focus on the gap between projected requirements and projected supply, DoD managers have two gaps that they must consider: the gap between the projected supply and the projected “required” demand (that is, the workforce demand identified through a consideration of customer demand and a translation of that demand into workforce requirements) and the gap between projected supply and “budgeted” demand. Although formal supply-and-demand analyses conducted at the installations typically focus on required rather than budgeted demands, managerial decisions are sensitive to the budget. One installation makes an effort to overexecute its employment plan, in part so that it is not targeted for budget cuts. They attempt to balance the budget by using “overhire,” which refers to extra funds generated when an employee takes unpaid leave or when a vacancy goes unfilled. Even when they exceed the budget at the installation level, the budget may balance at the command level if another organization underexecutes.

Gaps may be immediate or distant, long-term or short-term. Different strategies may be needed to address different types of gaps. It can be particularly difficult to address gaps when there is tension between short-term needs and long-term forecasts. For example, the

shipyards were experiencing a high-demand period in 2004, but they expect a 10-percent decrease in workload by 2007. They are hoping to be able to trim the future workforce by offering VERA/VSIPs when demand begins to fall. Similarly, DSCP is experiencing a workload surge, but it expects that demand will level off or decline after 2007. The difference between long-term and short-term needs has made DSCP cautious about succession planning.

The identification of gaps is strongly influenced by the level at which the gaps analysis is conducted. This influence is illustrated most clearly in the example of the NNSY and the activities of SEA-04X. At any given point in time, an individual shipyard may have a “gap” between supply and demand, although the workforce of SEA-4 system as a whole (NNSY, Puget Sound Naval Shipyard, Pearl Harbor Naval Shipyard, and Portsmouth Naval Shipyard) is in balance.

The identification of gaps is also influenced by the level of detail at which the gaps analysis is conducted. Although there may be no aggregate gap, such a gap may exist for specific skills.

Installations Use a Variety of Strategies to Address Workforce Gaps

DoD installations conduct gaps analyses and develop policies at various levels to address those gaps. When gaps are identified, a variety of approaches can be used, some short-term and some longer-term, to address those gaps. Some of the strategies are “self-contained,” or activities that are typically thought of as part of the workforce-planning process. Other strategies involve influencing parties that are outside the boundaries of the workforce-planning process, such as customers or resource managers at other levels of the organization.

Recruitment and Accession Programs. If the gap is due to a situation in which there are too few workers, then internships, apprenticeships, and recruitment bonuses are often used to attract and train entry-level workers. In addition, some installations have been able to work out agreements with local high schools, vocational technical programs, and universities to create courses or degree programs that provide training for potential future employees. For example, George Mason University offers master’s programs in systems engi-

neering and modeling simulation that are tailored to meet Dahlgren's needs. NNSY has a "school-to-work" partnership with local high schools whereby students are hired for 4 to 6 weeks during the summer and paid apprenticeship wages. NNSY is trying to get the state to recognize this program for high school credit. Figure 2.5 highlights a variety of efforts ongoing at Tinker AFB to address gaps, including collaborations with local universities and vocational-technical (Vo-Tech) schools, as well as continuing-education programs.

Most installations target military veterans when trying to hire journeyman-level workers. One disadvantage associated with hiring military veterans at journeyman or higher levels is that doing so may limit opportunities for career civil servants. Managers at one installation expressed concern that career civil servants had trouble making it beyond the GS-12 level because military retirees were often hired to fill positions at the GS-13 level or above. In the long run, career-advancement policies that systematically favor military retirees may hurt retention among civilians.

We saw little evidence of targeted efforts to recruit or hire mid-career civilians from the private sector in order to address projected workforce gaps.

When a gap analysis reveals a shortage of workers of a particular type, managers may be reluctant or even unable to hire permanent workers to meet the projected need out of their own budgets. This is particularly true if the new employees will need to go through a training program before they can contribute to the organization's mission. Centrally funded intern programs can provide a solution to managerial risk aversion on this score. The vast majority of the sites we visited had internship or apprenticeship programs that allowed them to train new workers. Internships can be locally or centrally funded. The Air Force, for example, is centrally funding "Knowledge Transfer Interns" programs through which entry- and journeyman-level employees are brought in to shadow experienced workers. At Tinker, interns are generally converted to full-time employees after two years, although Tinker's civilian personnel office does not guarantee that an offer will be made.

Figure 2.5
Addressing Workforce Gaps at Tinker AFB

Tinker AFB identified a number of potential workforce gaps, using a supply study that disaggregated the workforce down to the job-series level. Although the study did not explicitly focus on demand, it identified occupations that were at high risk for retirement or attrition. From this study, Tinker identified 17 “critical skills” for which they had concerns about future losses and the ability to find people to replace those who leave. The critical skills were determined using current expertise and input from educational professionals. Although the 17 critical skills were initially clustered into three areas (management and administrative, trades and crafts, and science and engineering), Tinker is now expanding the program to encompass additional areas.

A large part of the education and training program involves collaboration with local universities and Vo-Tech schools. Tinker uses its leverage as one of the largest employers in the state to motivate these schools to create programs that are aligned with Tinker’s needs. In exchange, Tinker gives special consideration to students who participate in the Tinker track programs. For example, when Tinker goes to campuses to interview, staff ask the universities to prescreen the résumés and forward only those who participated in the Tinker track. Colleges and universities have gladly supported this program, because Tinker is considered

At DSCP, most new employees begin in the intern program, which is centrally funded by the Defense Logistics Agency. Centrally funded internship programs have an advantage in that the local installation does not bear the cost of training, and they also remove some of the risk of hiring a nonperforming employee. Of course, eventually the installation must find the money to bring these employees on board full time. For the most part, the installations that we visited were able to find the money to hire successful interns after the central funding expired. We saw no evidence that interns were being hired superfluously.

Figure 2.5
Continued

an employer of choice in Oklahoma. One of the benefits to Tinker is that the costs for the training are borne by the universities and Vo-Tech schools.

In addition to the entry-level educational programs, Tinker is also supporting a variety of educational programs for existing employees. Tinker offers 75-percent funding for mission-related courses at accredited universities. It also has an 18-month program that stems from a memo of understanding with two local junior colleges. These colleges offer lunch-hour and after-work courses, at locations that are convenient to the base. Students in this program spend the first two years at a community college, then can transfer credits to a local university.

Finally, Tinker has created leadership-development programs for current employees. There are separate programs for degreed and nondegreed employees, as well as a program designed specifically for developing leadership skills in scientists and engineers. The programs for degreed employees can count toward master's-level course credit, and the programs for nondegreed employees can lead to an associate's degree.

Several installations expressed concern over the fact that, because of budget constraints, they may not be able to hire qualified interns once central funding expires. Although, in the first part of the 2000 decade, most installations have been able to come up with the necessary funds, budgetary constraints may have a larger effect than requirements in terms of determining the number of interns brought on board. For example, Tinker's engineering division hires 10 student career experience program (SCEP) interns a year because the budget is consistently able to sustain 10 new employees.

Retention Programs. Although recruitment and hiring efforts are an important way to respond to a projected workforce shortage, managers can also reduce such gaps by improving retention. One specific tool that managers have available to them is retention bonuses,

which can limit the exodus of needed workers for higher-paying employment opportunities outside of DoD. However, there are also limitations to using this tool. Whereas recruitment bonuses can be targeted to individuals, retention bonuses are made across the board to all employees within a specific category (e.g., by grade and job series). This difference makes it impractical to use retention bonuses to retain one or two workers with competitive job prospects in the external labor market. There is also some concern that retention and recruitment bonuses are “a day late and a dollar short.” That is, by the time organizations recognize the problem, find the funding, and obtain the authorization, over a year may have passed and the bonus no longer has a taker (i.e., is no longer needed or the person has left for another job).

In addition to retention bonuses, continuing-education programs are one potential perquisite for retaining workers with competitive outside offers. However, few such enticements are available to DoD managers. At several sites we visited, managers expressed concern over their ability to compete for high-quality workers under the current compensation and benefits system, which makes it difficult to appropriately reward high-performing employees. The National Security Personnel System may increase managers’ ability to retain workers, but—at this point—it is difficult to predict whether the system will be effective.

Separation Management. If gap analysis reveals that installations have too many employees, or too many of a particular type of employee, installations make use of voluntary early retirement authorizations and voluntary separation incentive payments to downsize or restructure the workforce. One installation distinguished among different types of VSIP. Several managers noted that instituting VERA/VSIPs for restructuring purposes is useful because they allow slots to be backfilled with newer skills. With a restructuring VERA/VSIP, the main goal is to decrease the number of managers, increase service, and lower the average grade level. In contrast, downsizing VERA/VSIPs abolish a position.

Aside from separation incentives traditionally targeted to retirement-aged individuals (VERA/VSIP), few mechanisms are avail-

able to reduce the workforce. Although reductions in force (RIFs) can be used to downsize the workforce in some cases, they are difficult to implement. Managers cannot easily remove less-needed employees who have not reached retirement age.

Education, Training, and Professional Development. Some installations offer continuing education, training, and professional-development programs to current employees. Such programs can serve two functions: They can help to develop the workforce by enhancing leadership and other professional skills, and they can be used to attract and retain motivated employees.

Civilian tuition assistance programs at Tinker pay 75 percent of tuition costs for mission-related courses. In addition, Tinker has developed a number of leadership-training programs for both degreed and nondegreed employees. For nondegreed employees, these training programs can lead to an associate's degree, and degreed employees can apply their credits toward a master's degree. Skills taught in these courses are designed to fill specific needs that have arisen at Tinker. For example, one of the training programs teaches leadership skills to science and engineering personnel, and it was developed to address the fact that many S&E professionals have difficulty switching to leadership roles as they advance in their careers.

DSCP offers a fellowship program in which employees are sent back to school, typically for undergraduate degree completion. Other entities that offer continuing education programs include Dahlgren and MAMC.

Flexible Workforce Management. Given the uncertainties inherent in demand forecasts and in order to respond quickly to unexpected needs, many installations have built flexibility into their workforce. The shipyards' borrow and loan program, described in Figure 2.3, is an elaborate approach to building flexibility into the workforce. This initiative allows workers to be temporarily moved across locations. For jobs such as accounting, in which relevant information and paperwork can be exchanged over the Internet, it might be possible to reallocate workload across locations while keeping workers at a fixed location.

Installations can also build flexibility into their system by retraining workers to meet emerging needs. For example, Dahlgren looks for generalists or people with interdisciplinary skills when hiring, so that the workforce can easily “morph” to fill unanticipated gaps (e.g., a mathematician might morph into a computer scientist). Other installations may formally retrain workers if one line of work is being phased out while another is ramping up. For example, NAVAIR has recently noticed a deficit of systems engineers but a surplus in avionics. It discussed the possibility of retraining some of the avionics people to fill systems engineering positions. Of course, the benefits of retraining would have to be weighed against the costs. For some jobs, it might be less costly to hire new workers than to retrain individuals within the existing workforce.

A related strategy is to promote multiple skills among members of the workforce so that an individual worker has the flexibility to perform a variety of tasks as needed. DSCP has started rotating interns through different product lines to give them a broader view of DSCP operations as a whole. Historically, it has not been common for DSCP workers to move across business lines, but DSCP is hoping to increase the flexibility of its system by providing this wider view. Finally, all installations make use of contract, seasonal, or temporary employees to address shortages on a short-term basis.

Customer-Demand Management. Some installations deal with unexpected increases in demand by postponing less-essential work when there is a surge. An administrator at SEA-04X, for example, attends fleet-scheduling conferences and will attempt to delay a routine docking if the shipyards are particularly busy with time-sensitive work. In some cases, service- or command-level headquarters might be able to allocate additional funds to the installation if customer demand suddenly becomes overwhelming. Such a situation occurred at Tinker, when problems related to the KC-135 air-refueling program created a workforce surge. The commander eventually added more funds to Tinker’s budget so that Tinker could appropriately deal with the situation.

Efficiency Initiatives. Many of the installations that we visited had ongoing efficiency initiatives designed to enhance the productiv-

ity of their workforces without necessarily increasing manpower or funding. In some cases, productivity enhancements have been imposed on installations without a clear plan for accomplishing workload under the new budget constraints. For example, DSCP's labor force was cut by 4 percent each year for a period of years, and the installation had to come up with a strategy to accomplish the same workload with a diminishing supply of workers. In other cases, installations have conducted systematic studies to determine how to achieve greater productivity. The manpower office at Tinker Air Force Base performs data-intensive management-advisory studies for such purposes; often, these studies involve modeling how the production process currently works, then perturbing the model to see where improvements can be made. At the command level, both the Navy and the Air Force have ongoing productivity initiatives (the Lean Six Sigma program and the Lean Aeronautics Institute program, respectively).

Sourcing Decisions. Because contractors can be hired, moved, and terminated more easily than regular civilian employees, contractors are often used to address surges in demand. In general, data on the contractor workforce is limited, making it difficult to understand the scope of the contractor workforce within DoD. Yet, anecdotally, most managers believe that the contractor workforce is growing over time. Installations can sometimes circumvent budgetary constraints by hiring contract workers as opposed to civilian staff. For example, government salary caps make it difficult for MAMC to hire specialized medical personnel in highly paid areas (e.g., radiology, anesthesiology). Since installations have more leeway the payments they offer to contract as opposed to civilian workers, MAMC frequently uses contract personnel to fill such areas. Although this strategy is one of the only ways to maintain an adequate supply of medical specialists under current budgetary constraints, it can lead to large pay differences between contract and civilian staff members doing essentially the same job. Such disparities could adversely affect morale and retention.

Influencing the Budget Process. Finally, installations can influence the budget process through the program objective memoran-

dum, a document submitted to command- and service-level headquarters that articulates future workforce needs. In general, the POM must justify all additions to the budget, although there is some flexibility for the installation to reallocate funds within the budget. When changes in demand are well justified, the POM can be an effective way to increase funding and/or authorizations. For example, the commander at DSCP was able to reduce assumptions about productivity growth from 4 percent to 1 percent by arguing in the POM that new business and start-up problems with the business systems modernization (BSM) initiative required additional funds. However, a drawback of the POM process is that it runs years ahead, which means that the POM is not always effective when quick changes are needed. To address sudden surges, managers are more likely to rely on temporary authorizations or contract workers.

Data Have Benefits for Workforce Planning and Workforce Flexibility, but the Costs of Collecting Data Can Be High

Installation-level managers recognize that many advantages would be associated with improved data quality and collection. Improved data on skills and competencies would facilitate managers' ability to move workers and reallocate workload to balance unexpected surges in demand. Better data would also provide a richer description of the current workforce and allow installations to make supply-and-demand projections at a finer level of detail. With automated data systems, managers could more easily identify gaps and could get quick, accurate snapshots of the current workforce. Automated data could also be shared across many levels within the DoD.

Many local managers expressed an interest in acquiring improved data. One individual told us, "Skills databases are not useful unless they go down a level or two to highlight specific skills." A colleague of this individual later argued that improved data could help answer the important question: "What are the core competencies needed for the core work that we do?"

Data on skills and competencies might be particularly useful for the purpose of reallocating workers to satisfy unexpected demand. With a database of workers' skills and competencies, managers would

be able to quickly locate workers with particular skills when needs emerge. The naval shipyards' tradeskill designators were developed specifically to facilitate their borrow-and-loan program (see Figure 2.3). Similarly, NAVAIR's Web-based data-collection initiative (see Figure 2.2) was developed explicitly to promote a flexible internal labor market.

However, detailed data collection can be costly, and it is important to consider the costs before implementing such a system. First, data can be expensive to acquire and maintain. Some detailed skills profiling that representatives at Dahlgren tried to do in the mid-1980s, fell by the wayside. Managers reported that such profiling was labor-intensive, reliant on questionable self-reports, and hard to keep up to date. One of the major costs associated with developing a skills codes database is identifying a structure for classifying worker skills. Additionally, to measure worker skills in a valid manner, a valid measurement system must be developed. At Dahlgren, this process involved collecting workers' self-reports of skills, asking managers to verify those reports, and categorizing skills reports in a consistent manner.

Second, some of those interviewed expressed concern about maintaining an adequate balance between managerial insight and the use of data on employee skills. Skills codes, no matter how detailed, can potentially mask subtle differences among workers that vary their effectiveness on the job. Leadership skills, communication skills, and the ability to cooperate with others may be particularly hard to assess and include in a skills and competencies database. On the one hand, there is some concern that an automated system would reduce managers' ability to weigh these subtle issues when assigning workers to projects. On the other hand, managerial insight is more subjective and tends to reside within one manager. If managerial turnover occurs, this type of person-specific information may be difficult to maintain. Although benefits may be derived from a systematic recording of less-concrete characteristics, it is unlikely that such information could be recorded in an objective and sustainable manner.

There is also concern that data systems that fail to capture important dimensions of the workforce would be of limited use and

may not prove to be good investments for the DoD. Certain tasks may be more easily described by skills codes than others, and therefore better suited for standardized data collection—for example, the 117 TSDs developed by the shipyards as a meaningful way of characterizing worker. In contrast, NAVAIR’s Web-based data collection initiative yielded 20,000 separate skills, a number that may be too large to be tractable.

A key factor that affects both the costs and the usefulness of new data systems is the organizational level at which data systems are developed. Local- and intermediate-level organizations may be able to develop data systems that fit their needs very precisely. Yet, since data collection is expensive, economies of scale may be associated with generating new data systems at a higher organizational level. Further, if databases are unique to local- or intermediate-level organizations, it may be difficult or impossible to use these data for DoD-wide analyses.

Overall, we encountered mixed perspectives of the net value of centralized data collection. It appears that centralized data collection may be particularly cost-effective for occupations or tasks that are very concrete, repetitive, or well defined, such as those performed in the shipyards and depots, but less well suited to research and administrative activities.

Summary of Site-Visit Findings

Our site visits revealed a variety of approaches to workforce planning in DoD. Supply analysis typically uses personnel data to project the current workforce inventory into the future; the projections are based on assumptions or historical trends of attrition. Although we found that data are available for supply analysis at the local and higher levels, information on competencies and skills was difficult to obtain at many locations.

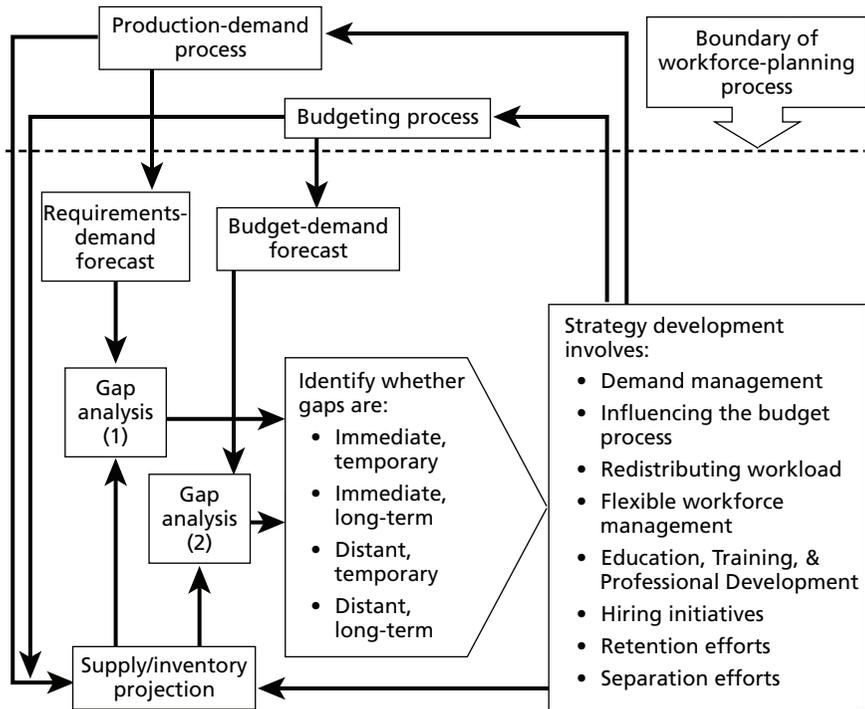
Demand analysis and gaps analysis are significantly more challenging for DoD installations than Figure 1.1 would suggest and involve several issues. First, it is difficult to estimate customer demand.

Even when customer demand can be estimated, locales vary in their ability to translate customer demand into estimates of the workforce required to meet that demand. Then, there is the question of how meaningful customer demand is at the local level. Local managers cannot just hire workers because it is determined that those workers are “needed” to meet customer demand. In the DoD, local managers face constraints on the total number of civilian work years they are allowed, as well as the total wage bill for civilian personnel. As a result, local managers must be conscious of at least two “gaps”: the gap between the “required” workforce and the workforce supply, and the gap between the “budgeted” workforce and the workforce supply.

In addition to the two types of gaps described above, the gaps that are identified may vary by urgency and expected duration. Some gaps are immediate; others will not emerge for many years. Both immediate and distant gaps can be temporary or long-term. Strategies for addressing gaps vary according to the type of gap and whether the strategy is designed to address the difference between the “required” workforce (demand) and supply or the gap between supply and the budgeted workforce. The strategies for addressing gaps feed back into future supply-and-demand analysis, either directly or, indirectly, through the budgeting process and the production-planning process. Although these processes are not typically thought of as part of the workforce-planning process, they do in fact influence workforce planning.

The more complicated reality described in this chapter is summarized in Figure 2.6, which explicitly considers the two types of gaps analyses that DoD installations must consider: the gap between the inventory of current resources and the estimated requirements needed to fulfill a particular goal, and the gap between the inventory and the personnel who can be supported by the budget allocated to fulfill the same goal. Gaps identified by the installation may reflect long-term trends or short-term demand shifts. They may reflect an immediate need or a need anticipated for a later date. Both the immediacy and the duration of the gaps will influence the strategies that the installation takes to address them. For example, resource

Figure 2.6
Workforce Planning at DoD Installations



RAND MG449-2.6

managers may use contract workers to address immediate, short-term needs but increase civilian authorizations if the needs are projected to last far into the future. Figure 2.6 also demonstrates that there is feedback between the strategies used to address gaps and future workforce-planning efforts, since these strategies will affect both the supply and demand of workers.

Because DoD is a complex, hierarchical organization, the gaps identified at the local level and strategies for addressing those gaps may be different from those identified by a higher-level planning process. Many organizations have recognized this difference and have incorporated a layer of planning that complements local workforce-planning efforts by addressing issues that are not visible at the local level. Such higher-level efforts allow the organization to move work-

ers across organizational boundaries to address gaps as they arise and to leverage resources in order to address the most pressing of these gaps. In DoD, such efforts exist within services (usually at the command or functional level) and defense agencies. It is worth considering whether there would be additional value to DoD-wide efforts, at least for some workforces. Just as the Tinker DP can move workers across business units within the installation and the SEA-04X can move workers between NNSY and PNSY if there is a shortage of workers in one location and an excess in another, it is plausible that OSD could facilitate the movement of employees in a specific occupation between, say, the Marine Corps and the Army.

A lack of data on the skills and competencies of the workforce and on customer demand limits workforce planning at several of the installations we visited. Data collection is costly and is often not something that an installation is inclined to support on its own. We observed several initiatives at higher organizational levels (typically at the command level) to develop data-collection tools that leverage resources across organizational boundaries. It appears that the relative benefit of data-collection efforts is higher for some activities (e.g., those that are more concrete and repetitive) than for others. Again, it is worth considering whether further leveraging of resources is warranted across services and agencies in DoD.

In the next chapter, we consider whether data are available to support OSD workforce-planning efforts, if OSD decided that a DoD-wide role is warranted in particular areas.

Data Sources for DoD-Wide Workforce Planning

Although the substantive effort of workforce planning is typically performed by business units in large organizations, the provision and maintenance of an organizationwide data system and instruction on how those data might be used for workforce planning are functions commonly performed at the corporate or organizationwide level.

DoD has been criticized for a lack of Department-wide data to support workforce planning, particularly on workforce requirements that specify required competencies (U.S. General Accounting Office [now Government Accountability Office], 2004). According to the GAO, this lack of data is the primary impediment to Department-wide strategic workforce planning. OSD asked us to provide recommendations for how having such data might facilitate DoD-wide workforce planning. One avenue that OSD may wish to pursue to facilitate workforce planning is to improve, encourage, or coordinate data collection. Another potential Department-wide role suggested by the literature review and the site visits is a Department-wide perspective on gaps analysis and the development of strategies to address gaps.

In this chapter, we review the resources currently available to support Department-wide workforce-planning efforts in data collection and gaps analysis and consider the plausibility of additional data-gathering efforts.

Data Sources for Supply Analysis

In this section, we present information on the civilian personnel data files currently maintained by DMDC. We address the quality and usefulness of these data for supply analysis and other workforce-planning purposes. We then describe the ways the DMDC data can be used for supply analysis.

Overview of the DMDC/DCPDS Data

The DMDC data are extracted periodically from the Defense Civilian Personnel Data System (DCPDS), an elaborate human resources management tool containing hundreds of data elements on worker characteristics. Although DCPDS collects a vast array of data, not all of the fields are equally reliable. Some fields (e.g., skills codes) are only recorded by certain components, and other fields (e.g., education) are not updated consistently. The DMDC data contain a subset of data fields from DCPDS that are tailored to the needs of data users and that are standard across all DoD components. It would be possible to add additional DCPDS fields to the DMDC data, with the caveat that large increases in the number of fields extracted would tax resources, and there may be little to gain from adding fields for which the information is less accurate.

The DMDC maintains several data files of potential interest for workforce planning:

- *The Civilian Personnel Master File* provides a snapshot of the demographic and employment characteristics of each DoD civil service employee who is active at the end of each fiscal year. Data are available from 1980 through the present.
- *The Civilian Transaction File*, a dynamic file on civil service employees, compiles all personnel actions recorded in a given year for a particular individual. Such actions include promotions, transfers, awards, wage grade changes, and other updates to an individual's work history. Data are available from 1980 through the present.

- *The Civilian Pay File* is a biweekly file created from data extracts from DCPDS. It includes information on pay, pay status, hours, and leave information for DoD civilians. Data are available from 1995 to the present.
- *The Civilian Central Personnel Data File* (CPDF) is an Office of Personnel Management (OPM) data file containing information for every civilian Executive branch employee, including DoD. The file contains information on the individual, position, and employment characteristics—fields that are also available in the Civilian Personnel Master File. In addition, the file contains information on basic pay, total pay, and health-plan characteristics. Data are available from 1985 to the present.

The information in these data files is extremely detailed, and files can be linked across years to provide a rich understanding of the career history of an individual.¹

The DMDC databases include substantial information on the individual's characteristics, position, occupation, and work location. Demographic data in the DMDC files include such characteristics as name, home address, age, gender, race, national origin, veteran status, disability, education level, hiring date, termination date and reason, and years of service. Generally, the demographic data in the DMDC files are rich; however, the education data field is often criticized as being inaccurate or outdated (Asch, 2001). Although education is reported to the DCPDS and fed into the DMDC data files when an employee first enters DoD, this field is not consistently updated if individuals acquire more education over time. As part of our review of data sources, we met with DCPDS program officials, who were able to explain the details of the current system and plans for future improvements. At present, DCPDS program officials are attempting to develop procedures that will improve the quality of the education variable.

¹ The actual records maintained by DMDC include Social Security numbers for each individual. The files obtained by RAND for research purposes include scrambled, not actual, Social Security numbers and do not include other personally identifying information.

Data on compensation and benefits are good. The Civilian Personnel Master File provides basic information on yearly compensation; the Civilian Pay File provides detailed information on pay, pay status, earnings deductions, paid time off, hours worked, and leave. The OPM CPDF database provides information on benefits. The Civilian Pay File can be linked with the Civilian Personnel Master File to produce a rich individual history.

In other ways, the DMDC data are more limited. The data contain a performance-evaluation score for each employee, as well as information about special awards or recognitions for each year. However, because a disproportionately large fraction of the DoD civil service workforce received a rating of “outstanding” (1 on the five-point scale) or “exceeds fully successful” (2 on the five-point scale), the performance data may be of limited use. The civilian personnel data contain little information on the knowledge, skills, and abilities (KSAs) required of particular positions. However, it may be possible to infer some information about KSAs from occupation codes and grade levels assigned to a position. The data also contain limited information on training and professional-development history.

Ultimately, DCPDS may be a more useful tool for workforce planning than the DMDC extracts. DCPDS contains many more data fields than the DMDC data. All data are retained, and historical data are available from 1999 (when the system was initiated) onward. An important distinction is that, whereas the data that are available from DMDC include information from every component, many of the fields in DCPDS have missing data. Although DCPDS contains data fields for skills codes and training, the consistency with which this information is recorded varies by component.

Using DMDC Civilian Workforce Data to Support Department-Wide Supply Analysis

In this section, we summarize the general types of analyses that can be accomplished with the DMDC data and present some results from an analysis of turnover. In Appendix B, we present other examples of analyses that can be accomplished with the DMDC data.

DMDC data can be used to provide OSD with an overview of the DoD civilian workforce, including overall demographic trends, information for individual installations, and information for specific functional occupational groups. More-detailed analyses (e.g., at the grade level or by detailed occupational groups) are also possible. Such analyses may be useful in helping OSD identify functional areas, installations, or other segments of the workforce that are facing particular challenges or could benefit from higher-level coordination.

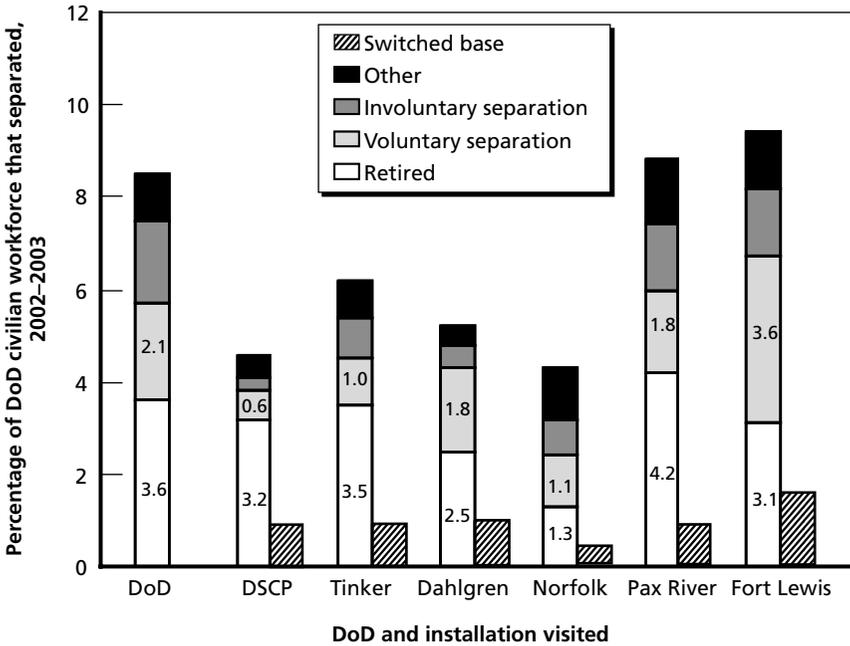
The Civilian Personnel Master File data can be used to understand the characteristics of the civilian workforce DoD-wide. Perhaps more important, the DMDC data can be disaggregated at a variety of levels to reveal trends in age, median years of service, variation in years of service, or retirement eligibility for specific segments of the workforce. For example, it is possible to focus analyses on specific occupations, locations (such as installations), and grades. Installation-level analyses could help OSD identify, for example, an installation with a very senior workforce that may be at risk for substantial retirement in the near future. Occupation-specific analyses may identify occupations that are more or less likely to be affected by a large number of retirements, for example.

DMDC Data Can Also Support an Examination of Employee Turnover

By linking individual records from the Civilian Personnel Master File across years and linking information from the transaction file to the master file data, it is possible to examine employee turnover from various perspectives. In this section, we look at separation trends overall and by specific type of separation, including retirement, transfer within DoD, voluntary separation not including retirement, and involuntary separation. Information on turnover could help OSD identify locations or occupations that face unusually high or low turnover or identify dramatic changes in historical turnover rates.

Retirement Is the Primary Reason for Separation Among DoD Civilian Employees. Figure 3.1 explores the reasons for separation from DoD employment between September 2002 and September 2003. An individual is considered to have separated from a particular

Figure 3.1
Installation-Level Separation of DoD Civilian Employees
(DoD and selected installations)



RAND MG449-3.1

organizational unit (in Figure 3.1, either DoD as a whole or the specific installation) if they appear as employed by that unit in one year, but not in the subsequent year. Our analysis summarizes the reasons for separation (as defined in the DMDC data) from a particular organizational unit into five categories: voluntary separation, involuntary separation, retirement, switched base, and other (death, switched to another government agency, etc.). The leftmost bar reflects separation trends for the DoD as a whole, and the other bars show separation trends for the six installations that we visited. This figure reveals that, DoD-wide, the rate of separation was just over 8 percent, and that nearly half of all separations can be accounted for by retirement. Voluntary and involuntary separations

were the two other major reasons for exiting the workforce, contributing approximately equally to DoD-wide separation trends.

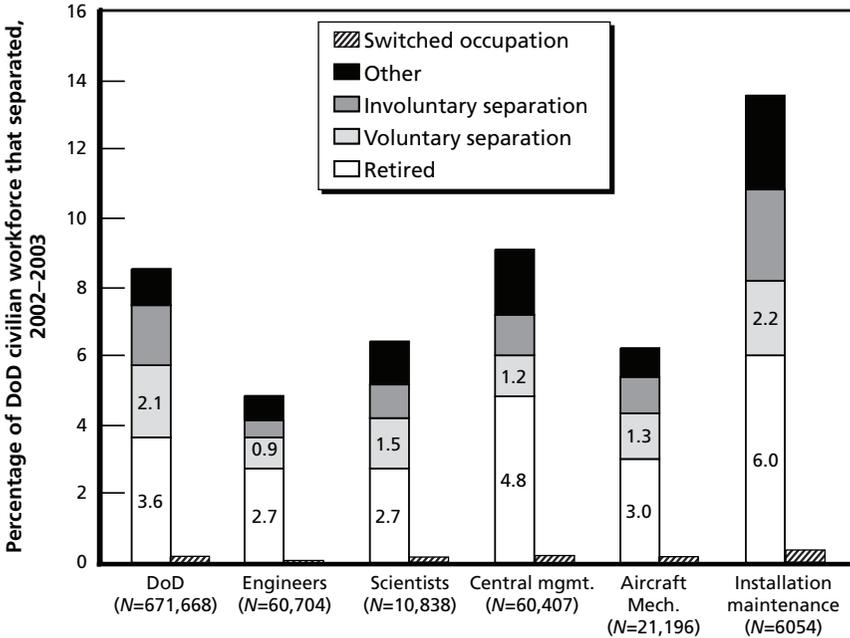
The installations we visited varied substantially with respect to overall rates of separation and to the reasons for separation. For example, the rate of voluntary separation (excluding retirement) at DSCP was quite low, with less than 1 percent of the workforce exiting voluntarily. In contrast, Fort Lewis had a relatively high rate of voluntary separation, at 3.6 percent. Similarly, Patuxent River had a relatively high rate of retirement (4.2 percent of the 2002 workforce), whereas Norfolk Naval Shipyard's retirement rate was relatively low (1.3 percent).

The "switched base" category, reflecting individuals who separated from a particular base but remained employed by DoD, shown to the right of the large bars in Figure 3.1, is only relevant for the installation-level analysis, since it does not imply separation from DoD employment. At most installations, base switching is roughly as common as involuntary separation.

It is also possible to examine turnover DoD-wide from a functional perspective. OSD may be interested in whether specific occupational groups have higher levels or different types of turnover. Figure 3.2 indicates separation patterns for five Functional Occupational Groups: Engineers, Scientists, Central Management, Aircraft Mechanics, and Installation Maintenance. The leftmost bar shows DoD-wide separation rates. Separation trends—particularly the rates of voluntary separation, involuntary separation, and retirement—are lower for scientists and engineers than for the DoD workforce as a whole. Central management has relatively high rates of retirement, which may reflect the fact that these higher-level management positions are filled by older, more-experienced workers. Installation maintenance stands out as having particularly high rates of separation, with 14 percent of the workforce exiting between 2002 and 2003. Retirement accounted for almost half of this attrition.

It is relatively uncommon for workers to switch occupational codes, with less than 1 percent of the workforce in any occupation leaving due to a switch. We should note that "switched occupation"

Figure 3.2
Separation of DoD Civilian Employees
(DoD and selected Functional Occupational Groups)



RAND MG449-3.2

is somewhat dissimilar from the other separation categories shown in Figure 3.2, since an individual “separates” from the occupation without exiting the DoD workforce. Nevertheless, from the perspective of the occupation, this separation reflects a loss that may need to be filled.

DMDC Data Can Provide Useful Information to Support Departmentwide Supply Analysis, but Questions Remain

Our review of existing DMDC data provided insight into how the DMDC data can be used for workforce planning. Figure 3.3 provides

Figure 3.3
Army Data Warehouse and Forecasting Tool Provides an Example of How DMDC Data Could Be Used

The Department of the Army maintains a servicewide data system and a civilian personnel–forecasting model that are used for strategic workforce-planning purposes. The Workforce Analysis Support System (WASS) contains inventory and transaction data on the Army’s civilian workforce since 1974. The data can be used to examine workforce characteristics and turnover. The data are similar to those that are available DoD-wide through DMDC or the DCPDS. As a result, the way the Army uses these data may reveal useful lessons for OSD. Although the WASS data contain information on occupational area and function, there are no data on employee competencies. The Civilian Forecasting System (CIVFORS) is an analytic tool that allows managers to develop workforce projections based on historical data. The tool focuses on key personnel transitions or events: accessions, promotions, reassignments, retirements, voluntary separations, and involuntary separations. The tool is based on a model that uses personnel characteristics to predict these key outcomes. Managers can use the tool to create projections based on an assumption that historical relationships between personnel characteristics and outcomes will continue into the future. Alternatively, managers can explore the implications of various assumptions regarding changes to those historical trends. These analyses can be performed Army-wide, at the installation level, at the career-field level, or at other levels of aggregation.

WASS and CIVFORS can be used for workforce planning. For example, the Army uses the personnel data and the projection model as inputs into the Intern Forecasting System, to justify requirements for and evaluate the success of the Army Career Intern Program (see Gates and Paul, 2004). This program is an Army-wide early-career professional-development program designed to train entry-level personnel for mid-career positions. Interns are hired at GS-5/-7/-9 grade levels and are promoted to journeyman grades (GS-10/-11/-12) at the end of the internship (usually two years). To assess the need for intern

Figure 3.3
Continued

positions today, the Intern Forecasting System must project the need for journeyman-level staff two years out. The model incorporates retirement, attrition, and “external gains” (that is, hires from outside). The prediction of external gains is based on historical data, and the most recent years are weighted more heavily. Outliers are discounted in the analysis. The output of the forecasting system is a gap between personnel requirements at the journeyman level and the staffing level expected without the intern program. This gap determines the intern program’s requirements. The projection of requirements involves assumptions about future needs. The Army runs different scenarios related to whether the size of the workforce will increase by 10 percent or 20 percent; decrease by 10 percent, 20 percent, or 50 percent; or remain the same. It uses the most reasonable or likely scenario in the budget justification for the intern program. The tool can also be used to determine what level of hiring will be needed to respond to anticipated retirements or to determine hiring needs by occupation.

The forecasting model has evolved over time. It was developed in the late 1980s to make Army-wide or command-level workforce projections. The tool has been refined over the years to allow for projections by occupation group or grade level, and, more recently, to allow for forecasting at the installation level (Snyder, 2001).

Although the GAO has criticized the Army for failing to validate the model underlying the CIVFORS projection tool through external peer review and to make information on the underlying model widely available, the tool has received substantial attention from government organizations (U.S. General Accounting Office [now Government Accountability Office], 2003). The Office of Personnel Management has incorporated WASS and CIVFORS into its Enterprise Human Resources Initiative (EHRI), the goal of which is to improve access to and the use of information among human resources specialists in the federal government. A version of WASS and CIVFORS is available to government managers through OPM (http://www.opm.gov/egov/EHRI_overview.asp).

an example of how the Army makes use of similar data for departmentwide workforce planning. The Office of Personnel Management has identified the Army's approach as a government-wide best practice and is encouraging departments to make use of this tool. If OSD is interested in conducting DoD-wide supply analyses, DMDC data provide a useful starting point.

Data Sources to Support DoD-Wide Demand Analysis

Demand analysis requires a systematic statement of future workforce needs. It involves an assessment of future customer demand and a mechanism for translating that demand into workforce requirements. Therefore, requirements determination can be viewed as the result of a demand analysis. The literature on workforce planning suggests that the sources of information for demand analysis are often more limited than the information available for supply analysis. Current staffing patterns can provide a useful starting point, but the demand analysis must also project into the future and consider what work the organization or agency will be doing and how that work will be accomplished. Even in the absence of technological change or major changes in demand, organizations should be considering how the workforce could be adjusted to perform the current work more effectively.

Agencies may wish to consider the following sources of information in developing a demand forecast, suggests the State of Washington Workforce Planning Guide (www.wa.gov/dop/workforceplanning/): strategic plans, formal statements of organizational objectives (e.g., balanced scorecards), performance agreements between employer and employees, budget documents, workload data and trends, and diversity goals. These information sources can help an organization figure out what needs to be done; however, identifying the competencies required to perform a job may still be difficult. The Washington Department of Personnel has developed some competency profile suggestions for some occupations, and it also recom-

mends that agencies consider competency suggestions developed by the Bureau of Labor Statistics.

Generally speaking, a demand analysis or requirements projection provides a systematic statement of future workforce needs. It emphasizes the important characteristics of the required workforce (e.g., experience level, competencies, occupation), as well as the number of employees and their work location. Demand analysis should also consider whether the work will be done by contractor or in-house employees. The assessment of future requirements is typically based on information that flows from the organization's strategic-planning process, such as information on strategic intent and the desired outcomes of the business unit or organization. Customer-demand estimates are also an important input into the requirements-determination process. Demand analysis uses information on current workforce needs as a starting point, then considers the implication of potential demand shocks, such as changes to an organization's mission, change in the demand for the activities or services provided by that business unit, the effect of efficiency initiatives or changes in the ways of doing business, or the effect of new technology on the required workforce level and mix.

Data systems can help organizations project and track specific workforce requirements. Ripley (1995) argues that a comprehensive skills-inventory system has allowed the TVA to incorporate position-skill needs into the workforce-planning system. At the same time, he notes, "a word of caution on automated support systems: Don't forget that every number the system produces, except for today's actual data, is a guess—a very good guess, perhaps, but still only that. Also, the further out the projection, the more the data degrade. Building an automated system that defines future gaps or surpluses in very specific detail implies a degree of precision that simply doesn't exist" (Ripley, 1995, p. 5).

The Department of Defense has been criticized for a lack of Department-wide data on workforce requirements, particularly on workforce requirements that specify required competencies (U.S. General Accounting Office, 2004). This lack is viewed as the primary impediment to effective strategic workforce planning. Below, we dis-

cuss potential sources of information for DoD-wide demand analysis and requirements determination, including Manpower Estimates Reports (MERs). Our review revealed that DoD does not currently have a process for assessing civilian requirements DoD-wide. The limitations exist both in terms of a lack of mechanism for assessing customer demand on a DoD-wide basis and the lack of a mechanism for translating demand into workforce requirements.²

Manpower Estimates Reports as a Potential Data Source for Demand Analysis

OSD asked RAND to examine whether Manpower Estimates Reports provide data that would be useful for DoD-wide demand analysis or workforce-requirements estimation. To explore this issue, we reviewed the MERs for active major acquisition programs. We examined existing MERs documentation and conducted follow-up interviews with service representatives who are involved in the MERs process. We considered not only the data actually available in the MERs but also any supporting analyses used to generate the MERs and the use of the MERs.

The general approach used to develop a MERs is consistent with workforce-planning approaches. Specifically, the services consider the current workforce, make adjustments based on changes in demand or the effect of technology,³ then generate estimates of the manpower that will be required to support the program.

Overview of MERs Reporting Requirements

Major acquisition programs are required to submit Manpower Estimates Reports to OSD for review at Milestone B (the initiation of an acquisitions program), Milestone C (authorization for entry into low-rate initial production), and at full-rate production. These re-

² As suggested by Ripley (1995), the lack of a mechanism may not be the only barrier to developing workforce requirements. Ultimately, precisely estimate workforce requirements may prove to be an impossible task.

³ There is no specific process for making such adjustments, and different activities perform this adjustment in different ways. Often, adjustments are subjective.

ports are required by Section 2434 of Title 10, U.S.C. The data submission required in the MERs is highly aggregated. Programs are to report, by fiscal year, the total full-time equivalent (FTE) personnel required for the program. The FTE projections are to be broken down by military, civilian, and contractor, and by the manpower required to operate, maintain, support, and train for the program. There is no requirement to further disaggregate the manpower requirements (e.g., by occupation, skill level), although there is an implicit assumption that such detailed analyses underlie the aggregate numbers reported in the MERs.

In developing the MERs, programs are required to address the following issues and document the responses in the MERs (U.S. Department of Defense, 2003d):

- Outline the DoD Components' official manpower position.
- Address whether the program is affordable from the perspectives of military end strength and civilian workforce.
- Clearly state the risks associated with achieving manpower numbers reported in the estimate.
- Consider the program objectives, but base the estimate on careful assessment of the risks and a realistic appraisal of the level of improvements most likely to be realized.

Revised guidance (U.S. Department of Defense, 2003d) also requires programs to conduct postfielding verification of high-risk factors.

Since the methodology for generating the MERs is not standardized⁴ and the guidelines are fairly broad, data on future workforce supply and demand are not readily comparable across programs. According to the guidance, the MERs should address personnel needs associated with systems engineering, design analysis,

⁴ Guidance on the manpower-estimating methodologies states that "The MER shall briefly describe methodologies used to estimate the manpower for each type unit and organization and state whether the DoD Component manpower authority, or designee, has validated the methodologies" (U.S. Department of Defense, 2003d, p. 14).

software management, systems integration. It does not account for DoD contracting or audit personnel.

In addition to reviewing the MERs, we conducted interviews with Air Force and Navy workforce-planning officials, who provided input into the MERs.

Information Provided in MERs Is Not Particularly Useful for Civilian Workforce Planning

Judging from our review of MERs, we conclude that these reports do not contain information that would be particularly useful for civilian workforce planning, because the reports cover or address only a small portion of the activities in which civilian personnel are engaged. In addition, the MERs are high-level policy documents that do not contain the kind of detail that would be required for workforce-planning efforts. MERs are a required element for major acquisition programs. They are not developed for standard operational activities that are not part of major acquisitions programs. MERs estimate the manpower required to operate, maintain and directly support the program. Military and contractor personnel dominate the workforce supporting these major acquisition programs at the current time. While MERs articulate the workforce requirements by personnel type (military, civilian, contractor), they do not justify those requirements with a discussion of the pros and cons of different personnel types. In addition, the reports do not contain detailed information on occupation or experience level required. According to interviewees, these considerations are usually made within the service sponsoring the program, but details regarding the consideration of these trade-offs are not documented in MERs.

Even when civilian personnel requirements are described in a MER, the level of detail is low. Generally, only the total number of required civilian personnel is included. Some MERs include information on grade level, but we did not observe any examples that include details on grade level and occupation level on civilian employees.

Analyses Underlying the MERs Are Not Supported by a Systematic Civilian Workforce-Planning Process

Underpinning the development of the MERs is information from more general manpower requirements determinations in the component that is responsible for the acquisition program. Although these details are not documented in the MERs, interviewees indicated that the process for specifying military manpower requirements is much more rigorous than the procedures for identifying civilian workforce requirements. According to an administrator in the Navy's Office of Human Systems Integration, the military manpower estimates draw on rich training and military requirements databases within the components, and methodologies used across components for estimating the military manpower required for different types of activities. There is no parallel componentwide system for estimating civilian requirements, although specific activities (e.g., shipyards, depots) do collect detailed data linking civilian manpower to specific output.

In theory, the MERs could require the services to report on a broader range of activities and to address civilian skills in more detail, such changes would likely require substantial new data-collection efforts. Ultimately, it appears that the real problem is the lack of a systematic methodology for developing civilian requirements estimates, coupled with a lack of data. It appears that addressing this problem directly, rather than indirectly through expanded MERs requirements, would be the more useful approach.

Information Developed for A-76 Studies Would Be a Much Richer Target for Data-Gathering Efforts

In the context of previous RAND research (Robbert, Gates, and Elliott, 1997; Gates and Robbert, 2000; Zellman and Gates, 2002), we reviewed in detail the documentation provided as part of A-76 studies in the Department of Defense. A-76 refers to the Office of Management and Budget circular that specifies the procedures that the federal government must follow when it competitively sources a function that is currently being provided by civil service or military employees.

As part of the A-76 process, an organizational unit must develop a Performance Work Statement (PWS), specifying the work that needs to be accomplished without articulating how that work should be performed. Managers must then consider the specifications of the PWS and develop a detailed workforce plan—called the Most Efficient Organization (MEO)—for accomplishing that work with the in-house workforce. Simultaneously, the government solicits private-sector bids for the work described in the PWS. The costs of operating under the MEO are compared with the bids of private contractors, through a formal competition process (see Gates and Robbert, 2000, for more details on this process). Given the results of this comparison, DoD decides whether to keep the work in-house or to provide it to a contractor. Basic data regarding the A-76 process are recorded in the Commercial Activities Management Information System (CAMIS), a DoD-wide database.

The MEO typically compares the existing performance levels to performance specified in the PWS and also compares the characteristics of the current workforce with the characteristics of the future required workforce. Any major differences (in staffing mix, required training, etc.) between current and projected requirements are discussed in the MEO documentation.

Judging from a review of those materials, we believe that the PWS and MEO reports would be a richer data-collection target than the MERs, for several reasons. First, whereas the MERs typically focus on functions to be performed by military personnel, MEOs focus on activities that will be performed by civilian personnel (even if they are currently performed by military personnel). Thus, the MEO is much more likely to contain information relevant for civilian-requirements development. Second, although the CAMIS records only the total number of civil service personnel required by the MEO, each MEO report we reviewed contained detailed information on staffing by organizational unit. The information on personnel requirements included civilian pay plan, grade level, and job title/series. Additional information was provided for swing- or night-shift requirements. Third, the process used to generate the MEO is consistent with OPM recommendations for effective

workforce planning. Finally, at Patuxent River, at least one group of functional managers relies on data from a recent MEO study to inform workforce-planning decisions.

In theory, a much more detailed reporting system based on the CAMIS could be developed, (Gates and Robbert, 2000). For example, organizations could be required to report current staffing levels by grade level and job series, along with the revised grade-level and job-series requirements specified in the MEO. In-house organizations that win MEO competitions could be required to continue reporting actual staffing. More challenging, but also possible, would be a system for reporting the requirements (or, better yet, the factors driving requirements) articulated in the PWS. Such information would be useful for workforce planning, but would also be useful for other purposes, such as validation and verification of MEO implementation and benchmarking activities across installations, commands, or services. The data would also provide a helpful resource for the development of future MEOs.

Currently, the A-76 process is applied only to activities that are being considered for competitive sourcing, and only those activities go through the MEO-development process. Activities that are already performed by contractors and activities performed by civilians that have not been considered for outsourcing do not produce PWSs and MEOs. However, the PWS and MEO process could be applied to these activities, and the requirements data recorded in CAMIS.

If every activity in DoD went through a PWS and MEO development, then DoD would effectively have requirements information for every activity. Gates and Robbert (2000) discuss some of the other potential benefits of such an approach, such as reducing the time it would take to conduct an A-76 study and being able to reap some of the cost-saving benefits of A-76 studies in activities that do not go through such a competition. Of course, the cost of developing the PWS and MEO is high. Therefore, DoD would need to carefully consider the value of such additional data collection.

DMDC Data Can Be Used to Help OSD Identify Targets for Centralized Coordination

To identify functional occupational groups that might benefit from coordinated workforce planning, it is important to consider two issues. The first is the extent to which DoD might plausibly benefit from cross-organizational consideration of workforce supply-and-demand issues for that occupational group. The potential benefit will be higher if both the employer organization and employees would be willing to support the movement of employees or workload across organizational boundaries in response to shocks to supply or demand. Such willingness is more likely for highly skilled occupations, particularly those that involve DoD-specific skills.⁵

The second issue to consider is the extent to which occupational groups are concentrated within specific organizational units in DoD. When one organizational unit (either a major command, agency, or an installation) employs a very large fraction of the total DoD civilian workforce in that area, it might make sense for that organizational unit to take the lead in workforce planning for that occupational group. Taking the lead would not mean that the largest employer would be tasked with making hiring and retention decisions for smaller employers. Rather, the largest employer could develop competencies and collect data. In addition, the largest employer's approach to requirements determination and strategic workforce planning could serve as a model for smaller employers.

When an occupation's workforce is distributed among several organizational units, OSD might try to facilitate coordination among those organizations. Finally, when the workforce is broadly distributed across DoD, OSD might want to take the lead in workforce planning for that occupational group.

DMDC data can help OSD categorize functional occupation groups across DoD and identify those that might benefit from coor-

⁵ Individuals in highly skilled occupations that do not acquire DoD-specific skills, such as nurses or educators, could find employment in other organizations outside of DoD and might be less geographically mobile than individuals in occupations that do involve substantial DoD-specific skills, such as naval shipyard workers.

dination on the part of OSD. We used the DMDC data to create a concentration index for each Functional Occupational Group (FOGMOG) and each location. The *index* is defined as the number of employees in a particular FOGMOG at a specific location divided by the total number of DoD employees in that FOGMOG. For each FOGMOG, we then looked at the maximum value of the index across locations, the number of organizational units with any employees in that occupational group, and locations with the five highest index values. We considered several ways of characterizing “location” in creating these indexes: the installation level, the bureau level (reflecting major commands and defense agencies), and the service level.

The bureau-level analysis generated the most insightful results for our purposes, and we present those results here and in Table 3.1. Of particular interest is maximum concentration index. FOGMOGs with a higher value on this measure have more concentrated workforces. The data in Table 3.1 allow us to distinguish among three different types of Functional Occupational Groups: (1) those that are highly concentrated in one bureau, (2) those that are concentrated in two or three bureaus, and (3) those that are fairly broadly dispersed across DoD.

Personal Services is an example of a FOGMOG that is highly concentrated in one bureau. A vast majority (81 percent) of the civilians who work in this Functional Occupational Group are employed by the Defense Commissary Activity. Although 41 bureaus employ individuals in this career field, the bureau with the next-highest share is Army Medical Command, with 6 percent. Other FOGMOGs that fall into this category for which there is one major employing bureau include Medical Attendants (Army Medical Command) and Educators (Department of Defense Education Activity), Management Technicians (Defense Finance and Accounting Service), Miscellaneous Mechanics and Repairmen (Army Reserve Command), Scientific and Engineering Technicians (Naval Sea Systems Command), Scientists (Army Corps of Engineers), and Financial Clerks (Defense Finance and Accounting Service).

**Table 3.1
Concentration of DoD Civilian Personnel by Functional Occupational Group**

Functional Occupational Group	Number of DoD civilian employees	Maximum concentration index	Bureaus with highest concentration index	Number of bureaus with any employees in this group
Personal Services	13,809	80.9%	Defense Commissary Agency (80.9%) Army Medical Command (6.0%) Immediate Office of the Commander-in-Chief of the U.S. Army Europe and 7th Army (2.7%) Naval Medical Command (1.7%) U.S. Air Force Academy (1.4%)	41
Medical Attendants	1,723	77.8%	Army Medical Command (77.9%) Naval Medical Command (8.9%) Air Training Command (4.1%) AFMC (3.4%) Air Combat Command (2.5%)	16
Marine Equipment Repairmen	1,255	71.6%	Military Sealift Command (71.6%) NAVSEA (19.8%) Pacific Fleet (6.5%) Atlantic Fleet (2.2%)	4
Medical Technicians	9,197	66.5%	Army Medical Command (66.5%) Navy Medical Command (17.5%) Air Training Command (4.0%) Military Entrance Processing Command (3.3%) AFMC (2.5%)	35

Table 3.1
Continued

Functional Occupational Group	Number of DoD civilian employees	Maximum concentration index	Bureaus with highest concentration index	Number of bureaus with any employees in this group
Educators	19,630	63.0%	DoD Education Activity (63.0%) U.S. Army Training and Doctrine Command (8.2%) Air Training Command (5.4%) Immediate Office of the Chief of Naval Operations (5.0%) Naval Education and Training Command (1.6%)	81
Medical	9,577	58.3%	Army Medical Command (58.3%) Navy Medical Command (22.8%) Air Training Command (3.9%) AFMC (3.3%) Air Mobility Command (2.0%)	66
Pipefitting Workers	3,323	40.0%	NAVSEA (40.0%) Naval Facilities Engineering Command (11.6%) Pacific Fleet (8.5%) AFMC (5.0%) Marine Corps (3.8%)	43
Management Technicians	12,931	36.6%	Defense Financing and Accounting Service (DFAS) (36.6%) AFMC (5.2%) Headquarters, Air Force Reserve (3.5%) Air Training Command (2.9%) Army Corps of Engineers (2.6%)	125

**Table 3.1
Continued**

Functional Occupational Group	Number of DoD civilian employees	Maximum concentration index	Bureaus with highest concentration index	Number of bureaus with any employees in this group
Aircraft Mechanics	13,422	35.9%	AFMC (35.9%) Headquarters, Air Force Reserve (22.6%) NAVAIR (15.2%) U.S. Army Missile Command (8.7%) Air Training Command (8.3%)	33
Metal Workers	11,329	32.3%	AFMC (32.3%) NAVSEA (23.3%) NAVAIR (15.4%) Pacific Fleet (5.3%) U.S. Army Missile Command (3.7%)	43
Financial Clerks	7,204	26.1%	DFAS (26.1%) Defense Commissary Agency (6.8%) Atlantic Fleet (6.7%) Army Medical Command (4.6%) Air Training Command (3.5%)	110
Scientific and Engineering Technicians	21,092	25.9%	NAVSEA (25.9%) NAVAIR (11.3%) Army Corps of Engineers (11.2%) AFMC (9.7%) Naval Space and Warfare Systems Command (3.8%)	91

Table 3.1
Continued

Functional Occupational Group	Number of DoD civilian employees	Maximum concentration index	Bureaus with highest concentration index	Number of bureaus with any employees in this group
Scientists	10,928	23.9%	Army Corps of Engineers (23.9%) NAVSEA (8.3%) Office of Naval Research (8.3%) Army Medical Command (7.6%) AFMC (7.1%)	99
Machine Tool Operators	4,208	22.3%	AFMC (22.3%) NAVSEA (21.5%) NAVAIR (15.7%) U.S. Army Armament Munitions and Chemical Command (9.1%) U.S. Army Tank Automotive Command (7.6%)	39
Engineers	61,636	22.1%	NAVSEA (22.1%) Army Corps of Engineers (13.0%) AFMC (12.1%) NAVAIR (9.3%) Naval Facilities Engineering Command (4.1%)	122
Electronics Mechanics	9,236	24.7%	AFMC (24.7%) U.S. Army Communications Electronics Command (12.9%) NAVAIR (9.5%) U.S. Army Missile Command (8.0) Headquarters, Air Force Reserve (7.8%)	56

**Table 3.1
Continued**

Functional Occupational Group	Number of DoD civilian employees	Maximum concentration index	Bureaus with highest concentration index	Number of bureaus with any employees in this group
Electricians	7,118	18.5%	AFMC (18.5%) NAVSEA (18.1%) NAVAIR (7.4%) Naval Facilities Engineering Command (6.6%) Army Corps of Engineers (5.6%)	56
Financial Management	26,218	17.0%	DFAS (17.0%) Defense Contract Audit Agency (13.4%) AFMC (7.4%) Army Corps of Engineers (4.3%) Air Force Audit Agency (2.6%)	141
Mathematicians	3,946	16.5%	NAVSEA (16.5%) NAVAIR (8.8%) U.S. Army Training and Doctrine Command (8.3%) Research and Development Temporary Carrier (7.3%) U.S. Army Materiel Command, All Others (4.0%)	115
Logistics Technicians	19,217	16.3%	AFMC (16.3%) Defense Contract Management Agency (14.5%) NAVSEA (9.8%) DLA (6.8%) NAVAIR (6.1%)	110

Table 3.1
Continued

Functional Occupational Group	Number of DoD civilian employees	Maximum concentration index	Bureaus with highest concentration index	Number of bureaus with any employees in this group
Miscellaneous Mechanics and Repairmen	15,198	16.2%	Army Reserve Command (16.2%) NAVSEA (11.9%) U.S. Army Tank Automotive Command (7.2%) Army Corps of Engineers (6.1%) Marine Corps (6.0%)	64
Logistics Management	54,464	15.2%	AFMC (15.2%) DLA (11.2%) Defense Contract Management Agency (7.9%) NAVSEA (4.8%) Naval Supply Systems Command (4.8%)	138
Installation Maintenance	5,723	15.0%	Army Corps of Engineers (15.0%) Army Medical Command (7.5%) Marine Corps (6.6%) Naval Facilities Engineering Command (6.2%) Air Training Command (5.2%)	72
Legal	3,252	14.3%	Army Corps of Engineers (14.3%) AFMC (5.6%) NAVSEA (3.8%) Field Operating Agencies of the Secretary of the Army (3.6%) DFAS (3.%)	113

**Table 3.1
Continued**

Functional Occupational Group	Number of DoD civilian employees	Maximum concentration index	Bureaus with highest concentration index	Number of bureaus with any employees in this group
Miscellaneous Production Workers	34,088	12.6%	DLA (12.6%) NAVSEA (11.1%) AFMC (9.0%) Army Corps of Engineers (8.7%) U.S. Army Armament Munitions and Chemical Command (5.3%)	96
Wood Workers	1,757	11.9%	Naval Facilities Engineering Command (11.9%) DLA (10.2%) U.S. Army Armament Munitions and Chemical Command (8.7%) NAVSEA (7.9%) Marine Corps (6.4%)	51
Vehicle Operators	4,959	11.8%	Army Corps of Engineers (11.8%) Military Sealift Command (7.8%) U.S. Army Armament Munitions and Chemical Command (7.5%) DLA (6.5%) Marine Corps (5.7%)	77

Table 3.1
Continued

Functional Occupational Group	Number of DoD civilian employees	Maximum concentration index	Bureaus with highest concentration index	Number of bureaus with any employees in this group
Logistics Clerks	7,014	11.1%	DLA (11.1%) Defense Contract Management Agency (9.8%) AFMC (7.2%) Army Medical Command (5.7%) U.S. Army Training and Doctrine Command (5.6%)	104
Fire and Police	16,798	11.0%	Atlantic Fleet (11.0%) U.S. Army Training and Doctrine Command (9.9%) Pacific Fleet (9.2%) U.S. Army Chemical and Biological Defense Command (5.1%) Headquarters, Air Force Reserve (4.9%)	67
General Office Operations	7,014	10.8%	U.S. Army Training and Doctrine Command (10.8%) Field Operating Offices of the Office of the Secretary of the Army (5.7%) Army Medical Command (5.7%) U.S. Army Forces Command (4.5%) Field Operating Agencies of the Army Staff (4.5%)	107
Miscellaneous Clerks	34,532	10.1%	Army Medical Command (10.1%) Army Reserve Command (7.4%) Army Corps of Engineers (6.6%) AFMC (5.5%) Naval Medical Command (4.5%)	146

**Table 3.1
Continued**

Functional Occupational Group	Number of DoD civilian employees	Maximum concentration index	Bureaus with highest concentration index	Number of bureaus with any employees in this group
Data Systems Management	25,708	9.6%	Defense Information Systems Agency (9.6%) AFMC (5.6%) DFAS (5.3%) DLA (5.0%) Naval Space and Warfare Systems Command (4.9%)	145
Personnel Management	10,145	9.1%	Field Operating Offices of the Office of the Secretary of the Army (9.1%) Navy Field Offices (7.0%) AFMC (6.2%) Air Force Manpower and Personnel Center (5.2%) Headquarters, Air Force Reserve (5.1%)	109
Miscellaneous Technicians	39,086	8.9%	U.S. Army Training and Doctrine Command (8.9%) Army Corps of Engineers (6.4%) DoD Education Activity (6.3%) Air Training Command (5.2%) AFMC (5.1%)	147
Secretarial	16,792	8.6%	AFMC (8.6%) Air Training Command (6.7%) Army Medical Command (6.7%) Air Combat Command (4.4%) Army Corps of Engineers (4.3%)	152

Table 3.1
Continued

Functional Occupational Group	Number of DoD civilian employees	Maximum concentration index	Bureaus with highest concentration index	Number of bureaus with any employees in this group
Miscellaneous Professionals	16,722	8.0%	Naval Sea Systems Command (8.0%) Army Corps of Engineers (7.0%) AFMC (5.1%) U.S. Army Intelligence and Security Command (4.3%) Naval Space and Warfare Systems Command (3.3%)	131
Central Management	61,420	7.1%	AFMC (7.1%) Army Corps of Engineers (7.1%) Naval Sea Systems Command (4.7%) Naval Air Systems Command (4.3%) DLA (3.9%)	162

For high-concentration FOGMOGs, for which there could be a substantial payoff to coordination efforts, OSD may want to encourage the organization that is the primary employer to take the lead in workforce planning–related activities, including the development of workforce-competency definitions and data-gathering efforts. OSD could support outreach efforts or communication between the “lead” bureau and other bureaus.

Next, we consider occupational groups for which more than one bureau is a major employer (a bureau employing 20 percent or more of the workforce). Medical is an example of a FOGMOG in which each of two bureaus in different services (Army Medical Command and Navy Medical Command) employs a substantial share of the total employees. Other examples include Medical Technicians (Army Medical Command and Navy Medical Command) and Metal Workers (Air Force Material Command, Naval Sea Systems Command). For FOGMOGs such as these, OSD might consider taking an active role in fostering cooperation among the major employing bureaus, then fostering outreach and communication efforts with other bureaus.

For some FOGMOGs, bureaus within the same service are the major employers. For example, the Navy is the primary employer of individuals in Marine Equipment Repairmen (Military Sealift Command and Naval Sea Systems Command) and Pipefitting Workers (Naval Sea Systems Command, Naval Facilities Engineering Command, Pacific Fleet). For other FOGMOGs, two or three services are the major employers. When the major employing bureaus are in the same service, it may make sense for that service to assume the lead role in workforce-planning and related data-gathering activities.

For many FOGMOGs, including a wide variety of support and management activities—personnel management, fire and police, data systems management, and secretarial—the maximum index is below 20 percent. These functional occupations represent workforces that are dispersed fairly broadly throughout DoD—occupations for which it might make sense for OSD to take the lead in workforce planning, if OSD concludes that there would be some benefit to DoD-wide

coordination of workforce planning in these occupations. For career areas, such as Secretarial, in which the labor market is local and positions require skills that are more general rather than DoD-specific, it likely will not make sense to engage in DoD-wide workforce planning (although, DoD might still consider spearheading new data-collection efforts for such occupations, if additional data would be useful to the local installations). However, there are likely federal government-specific, if not DoD-specific, skills involved for other occupations, such as Personnel Management, Central Management, Logistics Management, and Financial Management, and there might be some benefit to more-centralized management of such positions. Centralized coordination might also make sense in geographic areas such as Washington, D.C., where there are a large number of DoD employers.

We performed a similar analysis by installation and by service. The installation-level analysis reveals that very few occupational groups are highly concentrated at any one installation: Nearly 40 percent of Marine Equipment Repair personnel are employed at Norfolk Naval Base, 19 percent of Pipefitting Workers are employed at Puget Sound Naval Shipyard, 13 percent of Metal Workers and 11 percent of Aircraft Mechanics are employed at Tinker Air Force Base, and 11 percent of Mathematicians are employed at Dahlgren. However, these FOGMOGs are exceptions. In general, occupational groups span several installations, and it is not obvious that a coordinated workforce-planning effort should be led by any one installation.

The service-level analysis reflects insights discussed in the bureau-level analysis. Overall, each occupational group is employed in each service; however, for some occupational groups there is one service that employs a majority of the workforce. For example, the Army employs a vast majority of workers in the Medical and Medical Attendants fields, the Navy employs a majority of Pipefitting Workers, the Air Force employs the majority of Aircraft Mechanics, and other agencies employ a majority of Educators and Personal Services employees.

Summary

DMDC data provide a useful resource for DoD-wide supply analysis. As we have seen, it is possible to disaggregate DMDC data in a variety of ways. We demonstrated disaggregation by location and occupation. It is also possible to conduct analyses by grade level, experience level, or other variables. Disaggregated analyses allow OSD to identify installations and occupational groups that may be facing high rates of retirement and other workforce challenges. The data contain detailed information on position, years of experience, retirement eligibility, and other characteristics, such as wage grade, that can be used to evaluate current and past trends. Local installations make use of similar information from DCPDS when conducting supply analysis. Individual records from the DMDC data can also be linked across years in order to examine turnover. These data could also be used to help OSD identify occupations that could potentially benefit from Department-wide coordination in workforce planning.

However, the DMDC data also have some potential weaknesses. Although the DMDC files contain information on wage grade, they contain no information on competencies. And although DCPDS includes data fields for skills, such data are not widely recorded. The DMDC data also lack information on training certification and licensing. Further, the education information in the DMDC data may be biased as a result of lack of consistent updating.

In sum, although the existing data are rich and will cover many areas, they provide limited information on competencies, education, training, certification, and licensing.

Despite these limitations, data available for supply analysis are much stronger than data available for Department-wide demand analysis. We see no obvious source of existing data that can be tapped to provide immediate information for DoD-wide demand analysis. While Manpower Estimates Reports do provide an estimate of the required workforce, they apply to support activities that are least likely to use civilians. When civilian personnel are addressed in these reports, it is at a highly aggregated level. Because acquisition program support is not a major user of civilian personnel, efforts to refine data

collection related to civilian personnel are unlikely to yield much value for overall civilian workforce planning. A more attractive alternative would be to refine and possibly automate data collection that goes on as part of A-76 cost-comparison studies, and to potentially expand such data collection to activities that are not currently undergoing an A-76 study. Unless the scope and purpose of the PWS and MEO development were expanded, only a portion of DoD's civilian workforce would be covered.

Another strategy the OSD could pursue for generating data for demand analysis is to coordinate data-gathering efforts at the service and major command levels. As we saw in Chapter Two, such efforts are under way in some commands. OSD might be able to support these efforts in a way that prevents duplication and ensures that the data systems can be useful for DoD-wide planning.

Conclusions and Recommendations

Workforce planning is described as “getting the right number of people with the right skills in the right jobs at the right time.” It involves creating forecasts of worker supply and demand, comparing these forecasts to determine whether there are projected shortages or surpluses, and developing strategies to address projected gaps in workforce requirements. Requirements determination, whereby organizations estimate the quantity and skills mix of workers needed for the future, is a key component of demand analysis.

RAND was asked to consider current workforce-planning and requirements-determination activities within DoD and to make recommendations for improving these efforts from a DoD-wide perspective. In this chapter, we highlight our key findings related to DoD-wide workforce planning in general, and requirements determination in particular, and suggest some next steps for OSD.

Conclusions

DoD currently lacks a Department-wide workforce-planning or requirements-determination process for its civilian workforce. Such processes are in place to varying degrees at the service, command, and installation levels. In this section, we present conclusions based on our research regarding the resources that are available for DoD-wide workforce planning and requirements determination, as well as

workforce-planning and requirements-determination processes in use at lower levels of the organization.

Workforce Planning in DoD Is More Complicated Than the Basic Workforce-Planning Framework Would Suggest

Our site visits indicate that a wide variety of workforce-planning approaches is currently used in DoD. All installations engage in some form of supply analysis. Such analyses typically use personnel data from the Defense Civilian Personnel Data System to project the current workforce inventory into the future, based on assumptions or historical trends regarding attrition. These data are available to planners at higher organizational levels as well, and many commands, services, and agencies take an organizationwide look at workforce supply. According to managers, the main limitation of existing data is that information on competencies and skills is still difficult to obtain at many locations.

Demand analysis and gaps analysis are significantly more challenging for DoD installations than the basic workforce-planning framework would suggest. First, nearly all installations reported some difficulty in estimating customer demand. Installations also vary in their ability to translate customer demand into estimates of the required workforce. We also discovered that customer demand is not the only factor that managers must consider in assessing workforce demand. In the DoD, local managers face constraints on the total number of civilian work years they are allowed, as well as the total wage bill for civilian personnel. Such constraints complicate gaps analysis because local managers must be conscious of at least two gaps: that between the required workforce and the workforce supply, and that between the budgeted workforce and the workforce supply. Gaps that are identified may vary by their urgency and expected duration. Some gaps are immediate, while others will not emerge for many years. Both immediate and distant gaps can be temporary or long-term.

DoD installations have a wide range of strategies for addressing gaps. Some strategies, such as educational programs and internships, are more useful for addressing the difference between the required

workforce (demand) and supply rather than the gap between supply and the budgeted workforce. Similarly, some strategies are more useful for immediate gaps (e.g., the use of contract workers) and some are more useful for long-term gaps (e.g., succession planning). The strategies for addressing gaps feed back into future supply and demand analyses, either directly or, indirectly, through the budgeting process and the production-planning process.

Because DoD is a complex, hierarchical organization, the gaps identified at the local level and strategies for addressing those gaps are sometimes different from those identified by a higher-level planning process. Some services, agencies, and commands have recognized this difference and have incorporated a layer of planning that complements local workforce-planning efforts. Such higher-level efforts allow the organization to move workers across locations to address gaps as they arise and to leverage resources so that the most pressing gaps can be addressed.

DCPDS Data Provide a Rich Starting Point for Supply Analysis at All Levels

DCPDS data, and the Civilian Personnel Master Files that DMDC compiles from these data, provide information for supply analysis that can be used at all organizational levels—specifically, to support DoD-wide supply analysis. DCPDS records an abundance of demographic and job-related information on all DoD civilian employees, including data on occupation, career history, wage grade, base location, and years of service.

Yet, even with their many advantages, DCPDS data have several limitations that are relevant for workforce planning and supply analyses. Although DCPDS has the capacity to record information on training and certification, there is no agencywide requirement for recording such information and little incentive for local personnel offices to record or update it. Additionally, the type of training recorded may differ across component, making it difficult to use the information for DoD-wide analysis. As a result, from a DoD-wide perspective, the information available on this topic is spotty at best. Another major limitation is that, although DCPDS contains informa-

tion on occupation, components are not required to report data on the specific skills an individual possesses. Several managers with whom we spoke emphasized that detailed skills codes may be necessary before the best use of personnel data can be made.

Approaches to Demand Analysis Are More Varied and Sources of Data Are Limited

Whereas most of the sites we visited engaged in some form of supply analysis, not all sites conducted demand analysis. Demand analysis involves two important types of data: projections of customer demand and data that allow that demand to be translated into workforce requirements. The most significant barrier to demand analyses appears to be a lack of customer-demand projections. Although the DCPDS data are a source of DoD-wide information that can be used for supply analysis, we found no DoD-wide data sources that are available for demand analysis. Few organizations appear to have concrete customer-demand projections that are translated into workforce demand. Navy shipyards are an exception to this generalization.

A lack of quantifiable information on projected customer demand has implications for the workforce-planning process. However, it is important to emphasize that the inherent variability in customer demand can get in the way of workforce planning, even when comprehensive data systems are in place. Data systems can raise an organization's awareness of changes in customer demand, but they may not help the organization respond to these changes.

We reviewed two potential sources of information for Department-wide demand analysis, Manpower Estimates Reports and Most Efficient Organizations, and found each lacking in the comprehensiveness of data provided on customer demand and workforce requirements for the DoD. Program managers of major acquisition programs are required to submit MERs, indicating the personnel needs that will exist over the life of the program. The guidelines for developing the MER are consistent with the process for demand analysis. The general customer or program demands are articulated, and those demands are translated into estimates of military,

civilian, and contractor workforce requirements. Although useful in theory, the MER guidelines are at a rather high level and do not lead to the generation of detailed and consistent reports of civilian manpower requirements. As a result, no database on civilian workforce requirements results from the MER process. Even if the process resulted in such a database, the database would be of limited usefulness for a Department-wide requirements-determination process, because it would cover only personnel who work on the acquisition programs that are required to submit MERs. Only by significantly increasing the scope and level of detail available in the MERs could this methodology be used to inform DoD-wide workforce-requirements estimates.

The MEO development process, the other process that generates information on customer demand and workforce requirements, occurs as part of an A-76 cost comparison. Detailed reports on civilian personnel requirements are prepared during the development of an MEO. In theory, these reports could feed into data systems that record information on customer demand and on the workforce used to meet such demand. As with the MERs, Performance Work Statements and their resulting MEOs do not cover the entire civilian workforce. However, these reports could be developed for any activity. Although it would be costly to do so, this approach is likely to produce the most complete set of information on civilian workforce requirements.

Beyond these structured DoD-wide processes, we found many examples of installations that collect information on customer demand and translate that demand into workforce requirements. We also observed some locales that attempt to forecast workforce requirements in the absence of data on customer demand, usually by assuming an incremental increase or decrease in the standard way of doing business. The process of translating estimates of customer demand into specific workforce requirements involves the application of historical data to validated formulas or relationships. Data on customer projections are not available for all activities. Even when they are available—for example, in the shipyards—they are often subject to change. Similarly, validated formulas that relate customer demand

to workforce requirements exist for only a small set of activities. Managers with whom we spoke in our site visits expressed concern that even when demand projections are available and the workforce requirements can be well supported by historical analyses, funded work years do not reflect these projections. The inherent uncertainty in demand forecasts, coupled with the perceived difference between projected requirements and funded work years, may cause managers to place reduced emphasis on data gathering designed to measure customer demand.

Gaps Analyses and Policy Responses Depend on the Level at Which Workforce Planning Occurs

A primary reason for conducting demand and supply analyses is to enable an organization to perform gap analysis. The gap analysis should lead to action on the part of the organization to eliminate the identified gaps. A finding that arose from our analysis is that gaps that are identified and the tactics to address those workforce gaps are influenced by the level at which workforce planning occurs. For example, such efforts are undertaken at local installations and at the command, service, and agency levels. Efforts to address gaps at the DoD-wide level are currently limited.

It Is Important to Weigh the Costs and Benefits of Additional Data Collection

A lack of data, both regarding the skills and competencies of the workforce and the customer demand, is an issue that limits workforce planning at several of the installation we visited. Additional data collection would be required to support DoD-wide demand analysis, and gap analysis in particular. However, one of the lessons that we learned from our site visits is that data collection is costly, sometimes outweighing the benefits. Providing detailed data on skills codes, for example, may require collecting data from both employees and managers, followed by extensive review and validation to make sure that employees with similar skills are characterized in the same way. Without regular updating, older skills codes may become obsolete, whereas newer skills requirements may be missed. The review and

updating needed to maintain useful data systems might be extremely costly. Yet, since managers expressed concern that poorly designed data may be of little practical use, it may not be worthwhile to pursue additional data collection if funds are not available for review and updates. Moreover, excessive reliance on data collection and automation could diminish the role of managers in staffing decisions.

The value of additional data collection may also vary by occupation. It may be less costly to develop skills codes and labor standards for highly structured, frequently repeated tasks, such as those performed at Navy shipyards and Air Force and Army depots. In contrast, the costs associated with developing skills codes and labor standards for occupations whose tasks are more likely to be organization-specific, such as research-and-development tasks, may outweigh the benefits. It may also be difficult to develop skills codes and labor standards for high-tech occupations, since job requirements in these fields change very quickly as technology advances.

Recommendations

The Department of Defense has been criticized for a lack of Department-wide data to support workforce planning, particularly on workforce requirements that specify required competencies (U.S. General Accounting Office, 2004). According to the GAO, this lack of data is the primary impediment to Department-wide strategic workforce planning. OSD asked us to provide recommendations for how it might facilitate DoD-wide workforce planning and requirements determination. In crafting policy recommendations for OSD, we consider two important questions. First, what needs would DoD-wide workforce planning serve in what contexts? Second, how might OSD add value to the workforce-planning process by supporting local and agencywide efforts?

Certain Occupations or Geographic Regions Might Benefit from a Department-Wide Workforce-Planning Perspective

The organizational level at which workforce planning should be conducted depends on many factors, including the size of an occupation or workforce and the distribution of that occupation or workforce across DoD. In most cases, workforce planning should be left to local installations or higher-level organizations, which may be more attuned to their specific personnel requirements than OSD. Yet, OSD can play a supportive role by helping to identify segments of the workforce that could benefit from coordination across installations or other organizational boundaries, occupations, or geographic regions.

Our research indicates that the workforce gaps that are identified, as well as the plausible strategies for addressing those gaps, depend on the organizational level at which workforce planning occurs. Although local installations and business units play a key role in workforce planning, our research points to potential benefits of a higher-level, or “corporate,” perspective. This role is already being played by major commands, services, and agencies. It is plausible that OSD could add value through DoD-wide workforce-planning efforts for specific segments of the workforce. Just as the Tinker directorate of personnel can move workers across business units within the installation and as SEA-04X can move workers between NNSY and PNSY if there is a shortage of workers in one location and an excess in another, OSD might be able to facilitate the movement of employees in a specific occupation between, say, the Marine Corps and the Army.

To identify potential candidates for DoD-wide coordination, we conducted an analysis to identify Functional Occupational Groups (1) that are highly concentrated in one bureau, (2) that are concentrated in two or three bureaus, and (3) that are fairly broadly dispersed across DoD. For high-concentration Functional Occupational Groups, it would not likely make sense to engage in Department-wide workforce planning. However, OSD may want to encourage the organization that is the primary employer to take the lead in workforce planning-related activities, including the development of workforce-competency definitions and data-gathering

efforts. OSD could support outreach efforts or communication between the lead bureau and other bureaus.

For functional occupations whose workforces are dispersed fairly broadly throughout DoD, such as support and management activities—including personnel management, fire and police, data systems management, and secretarial—it might make sense for OSD to take the lead in workforce planning, if OSD concludes that there would be some benefit to DoD-wide coordination of workforce planning of such activities. DoD-wide coordination might also make sense in certain geographic areas, such as Washington, D.C., where more than one service or agency employs civilians.

Because the benefits of DoD-wide workforce planning are unclear, OSD would be wise to move in this direction slowly, perhaps with a focus on functions for which there are possible benefits to be reaped by moving individuals or workloads across locations to address workforce gaps. For example, OSD might focus attention initially on areas in which the workforce requires a relatively high degree of specialized training and for which the workforce is not primarily local, such as personnel management, data systems management, or financial management.

OSD Could Help to Improve Existing Data Systems

There are several ways that OSD could improve current DoD-wide data-collection efforts without imposing unduly high costs on the services/agencies. First, OSD could advocate broader use of such existing fields as skills codes in the DCPDS, without necessarily requiring that managers report this information. Agencies or occupations that already have skills codes in place would be strongly encouraged to use them; occupational groups, services, or agencies that have not yet developed skills codes could be encouraged to use existing skills codes or develop their own. OSD could also work toward developing a crosswalk that could be used to standardize the skills codes. Alternatively, OSD could promote a gradual switch to a standard set of skills codes.

OSD could also require more-frequent updating of the DCPDS education field to ensure that this information accurately reflects the

current state of the workforce. However, it is not clear that reporting requirements alone would improve data-gathering efforts. In general, the incentive that those submitting the data have to appropriately update various fields must be considered. In addition, OSD could encourage components to report information that would reflect certification and training of employees. Here, OSD could add value by promoting a common set of data on certification and training. However, doing so would require an agreed-upon set of DoD-, service-, or commandwide standards. Some of these standards, such as nuclear certification standards, might already exist. But others would have to be developed.

OSD Could Promote the Collection of Requirements Data Through CAMIS

Our research revealed that managers rely on a wide variety of data sources for demand analysis, that the level of detail available varies dramatically by location, and that there is no DoD-wide source of information on requirements. Although MER requirements provide a useful template for the overall process of demand analyses, concrete data sources to support DoD-wide demand analysis for the civilian workforce are currently more limited. However, if OSD wanted to have greater visibility over Department-wide workforce demand, the information in the PWSs and MEOs, collected as part of A-76 studies, could potentially serve as a starting point. These studies require an articulation of customer demand in the performance work statement, and a projection of the workforce required to perform the work. The MEO must discuss any gaps between supply and demand.

Since MEOs are usually generated only for support tasks that could be contracted out to the private sector, they cannot be used for all segments of the DoD workforce. Nevertheless, the MEO template could be applied even to activities that are not under consideration for competitive sourcing. However, as noted in Gates and Robbert (2000), MEO studies are costly to conduct. Again, OSD must weigh the costs and benefits.

OSD Could Work to Make the Gaps-Analysis Process Meaningful

Our research highlights the fact that local DoD managers face a workforce-planning process that is substantially more complicated than the simple workforce-planning model in Figure 1.1 would suggest. As illustrated in Figure 2.6, local managers cannot simply consider the gap between workforce demand and workforce supply. They must also consider the workforce that can be supported with budgeted resources, which is usually not the same as the “required” workforce.

Although DoD is interested in encouraging managers to more clearly articulate workforce requirements, for most managers such requirements have little or no usefulness, beyond helping the manager argue for more budgeted resources. If DoD wants managers to take requirements determination seriously, it must devise a way to eliminate the distinction between required and budgeted resources. It is possible that better DoD-wide data on workforce requirements could support this aim. If requirements were perceived by Congress and DoD policymakers to, in fact, reflect the workforce required to meet strategic objectives, then a decision to underfund an activity would have to be accompanied by a decision about how to adjust objectives.

These recommendations emphasize OSD’s most likely roles in supporting and facilitating an activity that is primarily a local effort and in creating an environment in which workforce planning can be successful.

Better Integration of Strategic Workforce Planning and Budget Processes Is Needed

Our study highlights the fact that the program objective memorandum process, and the budget process more generally, place substantial constraints on the ability of local managers to engage in effective strategic workforce planning—particularly when unexpected changes in demand require quick adaptation of the workforce. There are several issues that affect local workforce planning. First, the budget process is not fully responsive to changes in mission. Moreover, funding decisions frequently do not consider implications for strategic personnel management. Managers still expect budget cuts to be applied in an

arbitrary or an across-the-board manner, irrespective of the resources required to meet program objectives. As a result, local workforce planners are often caught between pressing functional needs and budget/end-strength constraints.

The development of an objective methodology for quantifying the relationship between mission and workforce requirements, coupled with a commitment to fully funding any mission, would facilitate a stronger link between the budget and workforce-planning processes. Perhaps the most important thing OSD (P&R) could do in the way of supporting effective workforce planning would be to ensure that the local environment in which managers operate (1) allows managers to engage in workforce planning and (2) rewards managers for effective workforce planning. Specifically, OSD (P&R) should work to promote a closer link between funding decisions and strategic workforce-planning processes. A study of how strategic personnel management is integrated (or not) into the POM process could yield some important insights into this issue.

Ensure That the National Security Personnel System Is Responsive to Strategic Workforce-Planning Needs

Workforce planners at every location we visited reported workforce management challenges resulting from the “lost generation”—DoD civil servants aged 30 to 40. The relatively inflexible, top-down policies that guided the defense downsizing in the post–Cold War era have left most organizations in the DoD with a dearth of mid-career or journeyman-level workers to replace those who are now retiring. Moreover, local managers find the federal personnel rules and regulations cumbersome for enabling them to attract workers in high-demand fields and to replace underperforming workers or workers whose skills are no longer needed.

DoD is in the process of rolling out the National Security Personnel System, which will replace the traditional personnel management system. A primary guiding principle of the NSPS is to put mission first—in other words, to ensure that the personnel system acts in support of DoD’s mission. If successfully implemented, the NSPS will go a long way toward ensuring that the personnel rules

and regulations support, rather than hinder, local workforce-planning efforts. However, close attention will be required to ensure that these objectives are in fact realized and maintained over time.

Additionally, OSD may wish to consider the development of special programs to support the accession of mid-career personnel with private-sector experience. Throughout the services and agencies, centrally funded intern programs are in place to support the hiring and initial training of entry-level personnel (Gates and Paul, 2004); likewise, the DoD-wide Defense Leadership and Management Program is in place to support training and development of senior-level personnel. There is a dearth of programs for mid-career positions, and a centralized program to support the hiring of such individuals could be a tool for helping local managers address a key workforce-management challenge.

Site-Visit Interview Protocol

This appendix includes the materials used in the site-visit interviews. The interview introduction and oral-consent script was used when introducing the interview to those individuals who agreed to participate and obtaining informed, oral consent. The actual interviews were semi-structured. The protocol was used to structure the discussion and focus the interview on core topics. However, follow-up questions and the emphasis on specific questions within the protocol varied by installation and by interview.

Interview Introduction and Oral Consent

Hello, I'm XXX, a researcher at the RAND Corporation. Joining me is AAA, who is also a researcher at RAND. Thank you for agreeing to speak with us. RAND is a nonprofit research organization located in Santa Monica, California. We are involved in a research project for the Office of the Under Secretary of Defense for Personnel and Readiness in OSD [the Office of the Secretary of Defense]. OSD recognizes that civilian employees play an important role in helping DoD [Department of Defense] achieve its mission, yet the process for determining civilian manpower requirements is not well understood. OSD has asked RAND to help it better understand the current process used to determine civilian manpower requirements, so that DoD civilian workforce-planning processes can be improved.

As someone involved in workforce planning and/or workforce management at the installation level, we would like to interview you to gather information about how the civilian requirements-determination and workforce-planning process works at this installation.

Our final research product may include a description of the workforce-planning process at this installation. Unless you ask us to keep this discussion confidential, we will thank you by name in the [monograph] and acknowledge you as a source of information.

Your participation in this discussion group is entirely voluntary. At your request, we will keep this conversation confidential, and will not disclose your name or attribute any comments to you in the [monograph]. If you do not wish to participate in this interview at all, please let us know now or at any point during our conversation.

Do you agree to participate in this interview?

Before we begin, please tell us:

- Would you like us to keep the information gathered in this interview confidential?
- What is your current position?
- How long have you been in this position?
- How long have you worked in this career area?
- How long have you worked at this installation?
- Contact information for clarification/follow-up.

Workforce-Planning Overview

[NOTE: In the following protocol, “Q” stands for *question* and “P” stands for *probe*.]

The goal of workforce planning is often described as “getting the right number of people with the right set of competencies in the right jobs at the right time.” The process involves creating a demand forecast for the workforce, conducting a supply analysis and a gaps analysis, and developing a strategy for addressing gaps.

Q1: Does your organization/business unit conduct workforce planning for the civilian workforce?

P1: That is, does your organization have a methodology in place for anticipating and planning for future workforce needs?

Q2: How is the scope of the workforce defined for workforce planning?

P1: At the installation level? UIC [Unit Identification Code] level? Other?

Q3: What workforce characteristics do you consider?

P1: Individual characteristics: age, race, gender, experience, education level

P2: Position characteristics: job series, grade level

P3: Knowledge skills and abilities, competencies, performance evaluations

Q4: Why are these characteristics chosen for consideration?

Q5: What sources of data do you use?

Q6: What other sources of information go into the workforce-planning process? (e.g., informed judgment, guidance from higher levels?).

Q7: Are civilian workers considered separately from military and contractor personnel?

Q8: Who is involved in workforce-planning efforts within your organization?

P1: Functional managers, business line managers, human resource managers, installation commander, manpower office?

Q9: Do you have any documented reports regarding workforce planning that you would be able to share with us?

Strategic Planning and Workforce Planning

Q1: Does your organization have a strategic plan that articulates future objectives, goals, and concrete outcomes?

Q2: Can you describe this plan?

P1: What is the time horizon?

P2: Are there specific goals, outcomes or targets?

Q3: Where is the strategic plan developed?

P1: What input into the plan comes from the installation? the business unit? major command? service? DoD? other levels?

Q4: Do the objectives of the strategic plan influence workforce planning?

Q5: Along what dimensions?

P1: Desired workforce characteristics?

P2: Desired numbers?

Q6: What workforce characteristics are thought to be particularly important in meeting the strategic plan or long-term goals of the organization?

P1: If these are not the characteristics that were mentioned earlier in the description of the characteristics that are examined as part of workforce planning, ask for clarification.

P2: Are there specific occupations that you prioritize in terms of workforce needs?

Supply Analysis

Q1: How much does your organization know about the current distribution of the workforce?

P1: Experience, occupation, grade level, risk for retirement, academic degree/discipline, KSAs [Knowledge, Skills, and Abilities], other?

P2: Who is involved in keeping track of the current workforce?

P3: How often is that information updated?

Q2: How does your organization project what the workforce will actually look like in the future?

P1: What methodology is used?

P2: Who is involved in making these projections?

P3: What characteristics are considered?

P4: Do you incorporate anticipated policy changes in this analysis?

Demand Analysis

Q1: How does your organization determine the workforce characteristics that will be needed in the future?

P1: What methodology is used?

P2: Who is involved in making these projections?

P3: What characteristics are considered?

P4: Are anticipated policy changes incorporated in this analysis?

Q2: What role will contract employees play in meeting future workforce needs?

Q3: What are the barriers to estimating future workforce needs?

Gap Analysis

Q1: Does your organization compare projected future needs with projected future supply?

P1: Is there a specific methodology for doing so?

P2: What are the strengths/weaknesses of the methodology?

P3: What workforce characteristics are focused on for this type of analysis?

Q2: What does the organization do if there is a gap?

P1: Is there a specific methodology in place?

P2: What are the strengths/weaknesses of the methodology?

Q3: Are there particular occupations for which you anticipate a notable shortage or surplus?

Q4: What are the barriers to addressing the gap?

Use of Workforce-Planning Information

Q1: How does workforce planning in your organization feed into other levels of workforce planning throughout the DoD?

Q2: How is your workforce planning influenced by other organizational units of the DoD?

Q3: Is there any evaluation of the workforce planning process?

P1: Are these policies known to be effective?

P2: Have they been tried elsewhere?

A-76 Competitions and MEO Development [if time permits]

Q1: Has your organization gone through an A-76 cost competition?

- Q2: If yes, was that process closely linked with workforce planning? Was a lot of additional data gathering required to develop the MEO?
- Q3: If a study was won by MEO, do you continue to gather data to ensure that the organization remains faithful to the MEO?
- Q4: If your organization has not been through an MEO, is there a clear process for you to follow in the event that you need to develop an MEO?
- Q5: Would that process require a substantial amount of new data gathering?

P1: Are these processes known to be effective?

P2: Have they been tried elsewhere?

Conclusion

- Q0: Installation-specific questions, as needed.
- Q1: What are some of the largest human-capital challenges you have faced recently and anticipate in the future?
- Q2: Are there any other important matters that we have not touched upon?

Examples of Civilian Workforce Analyses Using DMDC Data

In this appendix, we present examples of analyses that can be accomplished with the Defense Manpower Data Center (DMDC) data. In presenting the results of these analyses, we also highlight the installations that we targeted for site visits during the course of this project.¹

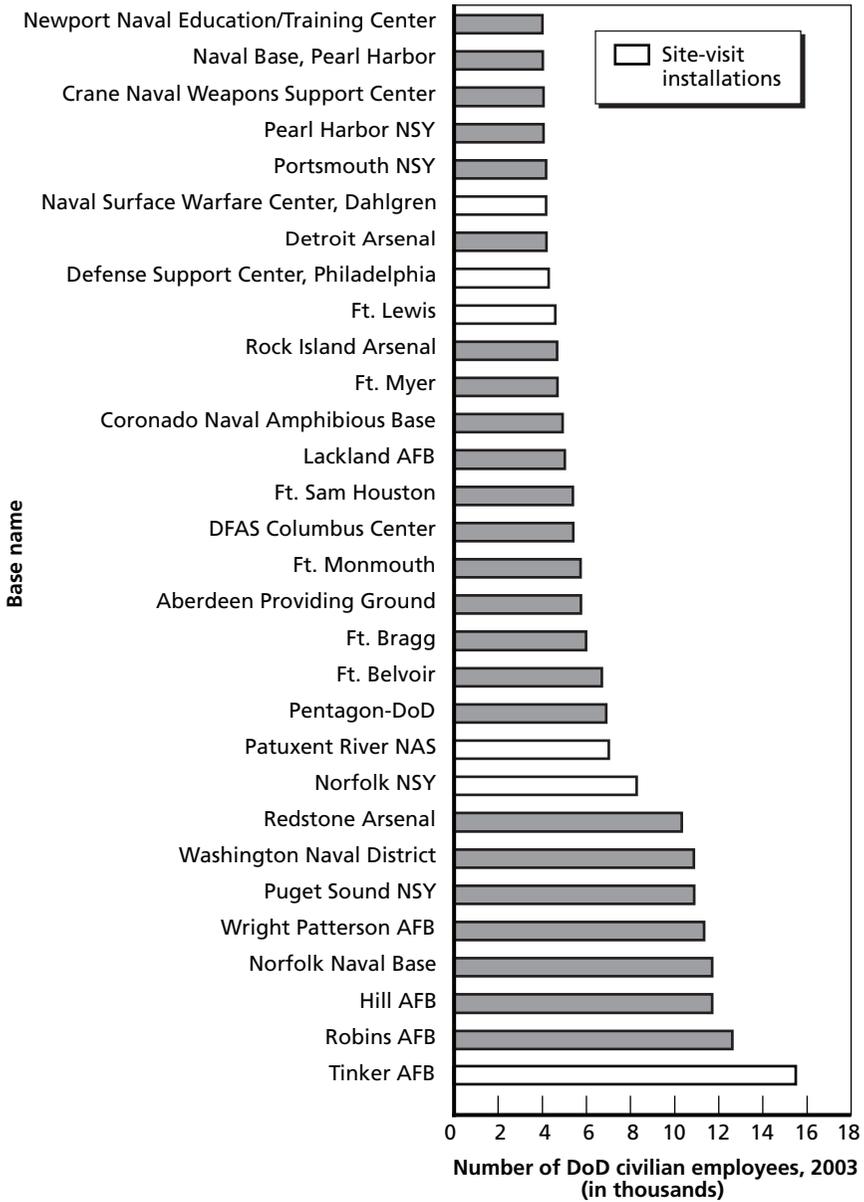
The Civilian Personnel Master File data can be used to understand the overall composition of the civilian workforce, in terms of both demographic characteristics and retirement eligibility. Perhaps more important, the DMDC data can be disaggregated at a variety of levels to reveal trends in age, median years of service, and retirement eligibility for specific segments of the workforce. For example, it is possible to focus analyses on specific occupations, locations, and grades. Here, we focus on trends in age and median years of service across DoD installations. It would also have been possible to conduct analyses that were specific to a geographic region such as a state or—in some cases—to disaggregate the data by Unit Identification Code (UIC).²

We focus attention on the 30 largest DoD installations as measured by civilian employment as of September 2003. Figure B.1

¹ SEA-04X is not highlighted because it is a headquarters rather than an installation and because it conducts workforce planning for several DoD sites.

² Our initial analysis revealed that the UIC information in the DMDC data is not always reliable, suggesting that this variable should be used with caution.

Figure B.1
Largest Employers of DoD Civilians



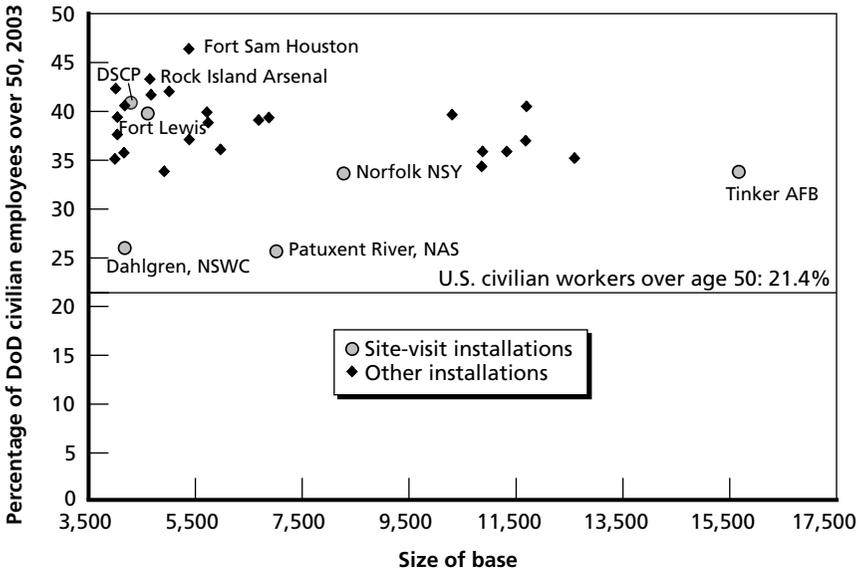
describes the size of each of these installations by the total number of DoD civilian employees. We can see that Tinker Air Force Base is by far the largest employer of DoD civilians, with 15,525 civilian employees as of September 30, 2003. Each of the installations considered in this analysis had at least 4,000 civilian employees. Installations that we eventually selected for site visits are shown in white.

DMDC Data Support an Installation-Level Analysis

Figure B.2 shows the percentage of the workforce over the age of 50 at each installation, with size of installation on the horizontal axis and percentage over 50 on the vertical axis. Installations that we visited are represented as gray circles; other installations are represented as black diamonds. We have labeled other installations that are of particular interest. For the U.S. civilian workforce as a whole, only 21.4 percent of the workforce is over 50. As Figure B.2 reveals, each of the 30 largest DoD installations is well above this average in its percentage of workers over 50. Several DoD installations, including Rock Island Arsenal and Fort Sam Houston, stand out as having a particularly aged workforce, with more than 40 percent of the workforce over age 50. At the other end of the spectrum are Dahlgren Naval Surface Weapons Center (NSWC) and Patuxent River Naval Air Station (NAS), where approximately one-quarter of civilian employees are over 50. Even of these installations ranks above the national civilian average.

DMDC data could be used to examine other demographic characteristics, such as the median years of service, variation in years of service, or the fraction of the workforce that is retirement-eligible. Organizations may be interested in the median years of service of the workforce as a rough indicator of whether the workforce will experience substantial retirements in the near future. Organizations may also be interested in understanding the distribution of the experience across the workforce, as a way of ascertaining whether the pipeline can support workforce continuity.

Figure B.2
Fraction of an Installation's Civilian Workforce over Age 50



RAND MG449-B.2

Master File Data Can Also Support the Analysis of Occupational Groups

The Office of the Secretary of Defense (OSD) may also be interested in how demographic trends vary by occupation. Occupation-specific analyses may identify occupations that are more or less likely to face a challenge due to a large number of retirements, for example. In this section, we examine differences across Functional Occupational Groups, which categorize DoD workers into 38 occupation categories such as Metal Workers, Engineers, and Central Management. Although we focus on Functional Occupational Groups, the DMDC data can be disaggregated even further, using occupational series codes. It is also possible to classify occupational categories more broadly, using either Professional, Administrative, Technical,

Clerical, and Other white collar (PATCO)³ or the first digit of the Functional Occupational Group code.⁴ Here, we focus attention on the 30 largest DoD Functional Occupation Groups as of September 2003. Figure B.3 ranks these occupations from smallest to largest, with number of employees shown on the left-hand side of the graph. Engineering is the largest occupational group, with 61,875 civilian employees in 2003. Other large occupational groups include Central Management and Logistics Management.

Below, we present an analysis of median years of service by Functional Occupational Group. Figure B.4 shows substantial variation in median service across occupations. For example, the median employee in Education, Personal Services, and Medical occupations has relatively few years of experience (under 10). In contrast, Logistics Management, Logistics Technicians, Science and Engineering Technicians, and Personnel employees have a median level of experience of over 20 years.

Looking solely at median years of service may mask variation in the distribution of experience across occupation. OSD may be particularly interested in the distribution of experience, since this informs whether there is a pipeline in place that can maintain continuity when retirements occur. For example, individuals in some

³ White-collar occupations are often classified into five major categories: Professional, Administrative, Technical, Clerical, and Other white collar, or PATCO. In the DMDC data, the PATCO field also contains a flag for blue-collar workers, allowing researchers to disaggregate the data into six categories.

⁴ Functional Occupational Groups are two-digit codes, and the first digit of each category denotes a broader occupational category. Specifically, science and engineering occupations begin with 1, professional occupations begin with 2, management occupations begin with 3, technicians (e.g., medical technicians), begin with 4, clerical occupations begin with 5, safety and service occupations begin with 6, mechanics and production occupations begin with 7, and logistics and maintenance occupations begin with 8.

Figure B.3
DoD Civilian Employment, by Functional Occupational Group

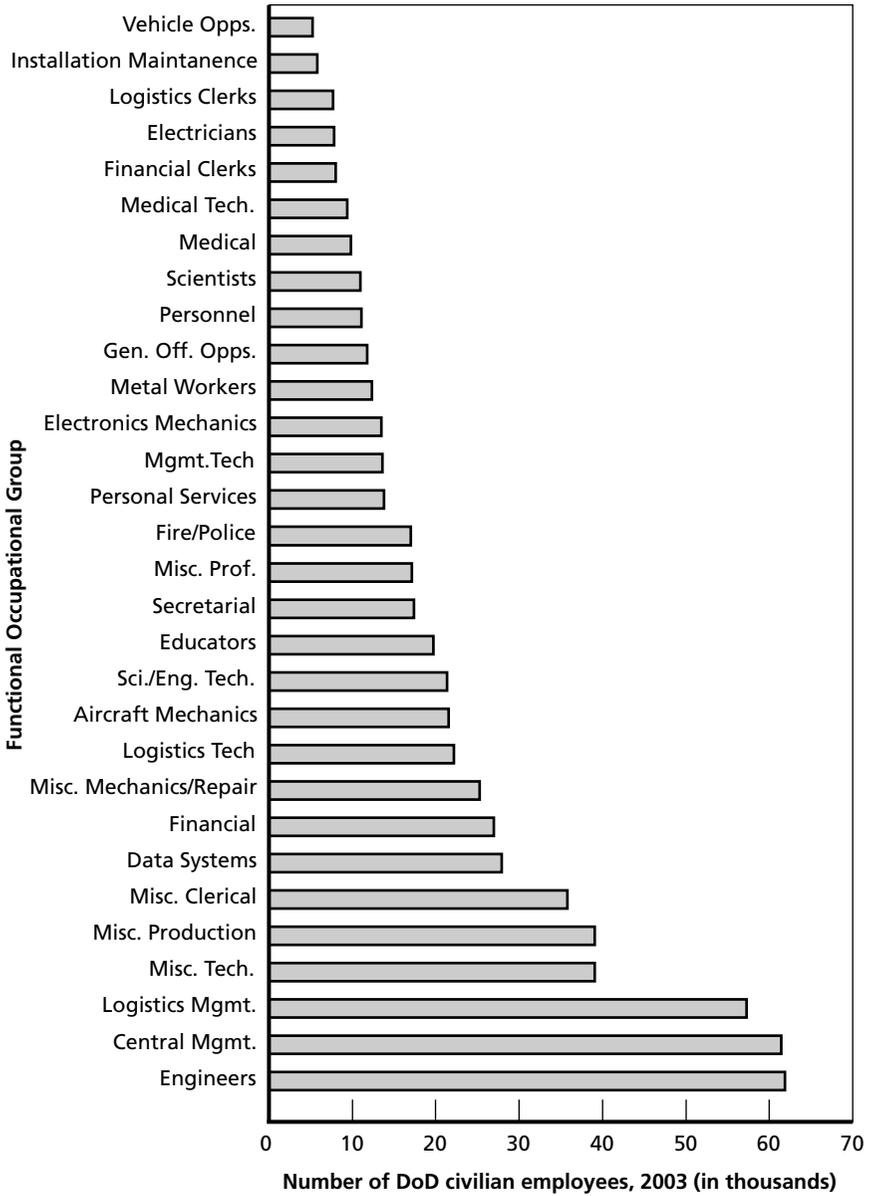
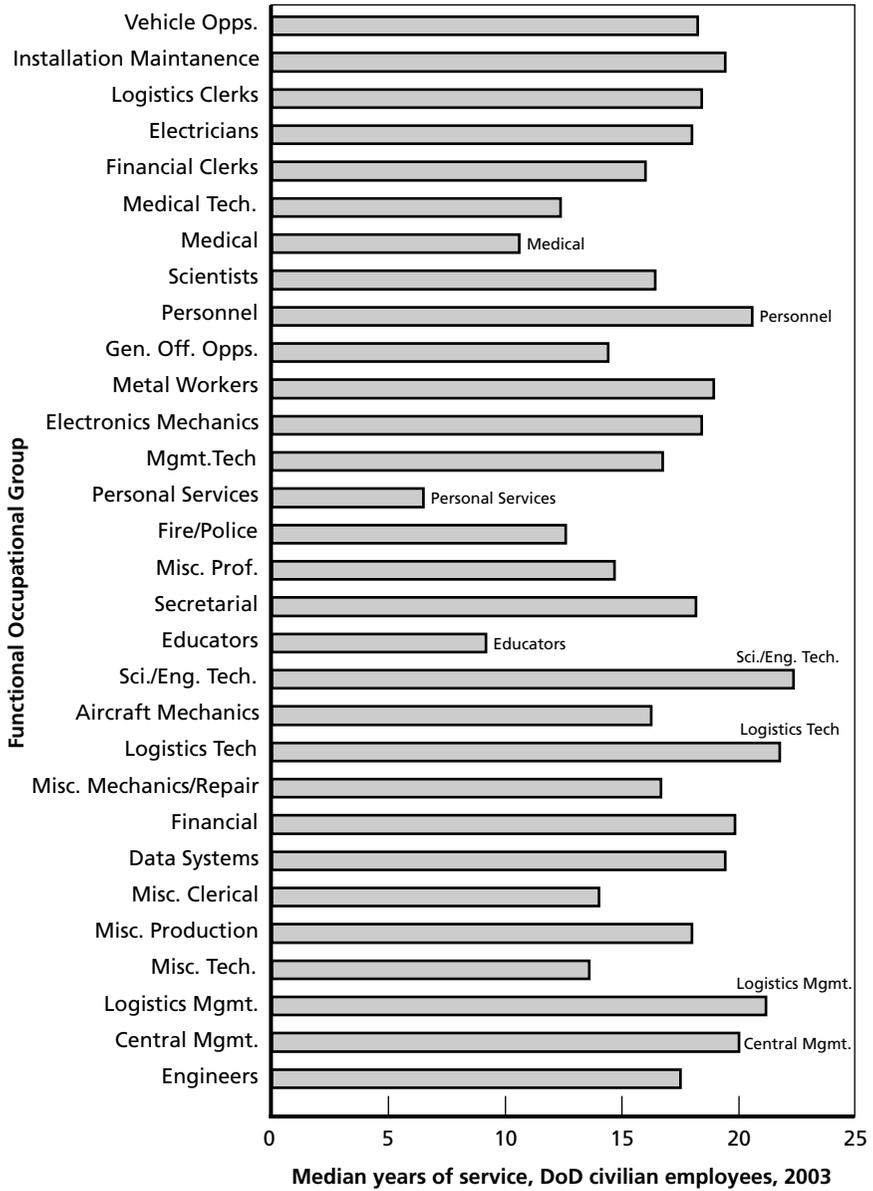


Figure B.4
Median Years of Service, by Functional Occupational Group



occupations may be clustered so that many people have experience close to the median; in other occupations, the distribution may be more spread out.

In Table B.1 we look at the distributional characteristics of several occupations with similar average experience of about 17 years. We list the occupations in the table according to the ratio of the 75th-percentile to the 25th-percentile years of service. This ratio is a rough measure of the age dispersion for an occupation, with lower ratios reflecting more-concentrated age distributions and high ratios reflecting broader age distributions. The distribution of years of service across these occupations varies considerably. There is relatively little variance in the experience of Legal employees—25 percent of legal workers have fewer than 9.7 years of experience, and the median Legal worker has 16.9 years of experience. In contrast, there is more variation in the distribution of experience for Miscellaneous Production workers. While 25 percent of these workers have fewer than 6 years of experience, median experience for this group is 18 years of service. These findings suggest that a large fraction of the

Table B.1
Distribution of Experience (years of service), Selected Occupations

Occupation:	Mean	Percentiles			Ratio of 75th to 25th
		25th	50th (median)	75th	
Engineers	16.9	9.3	17.5	23.2	2.5
Legal	16.9	9.7	16.9	23.8	2.5
Vehicle Operators	17.2	7.7	18.3	24.2	3.1
Scientists	16.5	7.3	16.4	24.2	3.3
Metal Workers	17.3	7.3	18.9	25.4	3.5
Electricians	16.8	6.9	18.0	24.8	3.6
Miscellaneous Production	16.6	6.3	18.0	25.0	4.0

Miscellaneous Production workforce has either very low or very high experience, and a smaller fraction has experience close to the median. Relative to Legal workers, the Miscellaneous Production workforce might thus be at greater risk of facing a situation in which significant numbers of senior-level workers retire and there are few journeymen-level workers to fill the gap.

References

- Asch, Beth, *The Pay, Promotion, and Retention of High-Quality Civil Service Workers in the Department of Defense*, Santa Monica, Calif.: RAND Corporation, MR-1193-OSD, 2001.
- Cogburn, Jerrell D., “The Benefits of Human Resource Centralization: Insights from a Survey of Human Resource Directors in a Decentralized State,” *Public Administration Review*, Vol. 65, No. 4, July 2005, pp. 424–435.
- Crawford, J., *State Workforce Planning 2000. Government Performance Project*, Syracuse, N.Y.: The Maxwell, Campbell Public Affairs Institute, 2001. Available online at www.maxwell.syr.edu/gpp/pdfs/Workforce_planning.pdf; accessed March 1, 2004.
- Crosby, Enging, “U.S. Army Civilian Analysis and Forecasting Tools for Workforce Planning,” Presentation at an Office of Personnel Management Session, June 2001. Available online at www.opm.gov/workforceplanning/MiniSessions/sessioniv/myopmchrts.pp; accessed May 20, 2005.
- Emmerichs, Robert M., Cheryl Y. Marcum, and Albert A. Robbert, *An Executive Perspective on Workforce Planning*, Santa Monica, Calif.: RAND Corporation, MR-1684/2, 2004a.
- , *An Operational Process for Workforce Planning*, Santa Monica, Calif.: RAND Corporation, MR-1684/1, 2004b.
- Gates, Susan M., and Christopher Paul, *Intern Programs as a Human Resources Management Tool for the Department of Defense*, Santa Monica, Calif.: RAND Corporation, MG-138-OSD, 2004.

- Gates, Susan M., and Albert A. Robbert, *Personnel Savings in Competitively Sourced DoD Activities: Are They Real? Will They Last?* Santa Monica, Calif.: RAND Corporation, MR-1117-OSD, 2000.
- Ripley, David E., "How to Determine Future Workforce Needs," *Personnel Journal*, Vol. 74, 1995, pp. 83–88.
- Robbert, Albert A., Susan M. Gates, and Marc N. Elliott, *Outsourcing of DoD Commercial Activities: Impacts on Civil Service Employees*, Santa Monica, Calif.: RAND Corporation, MR-866-OSD, 1997.
- Snyder, David (U.S. Army), "U.S. Army Civilian Analysis and Forecasting Tools for Workforce Planning," Presentation at an Office of Personnel Management Session, June 2001. Available online at <http://www.opm.gov/workforceplanning/MiniSessions/session-v.htm>; accessed May 20, 2005.
- South Carolina Budget and Control Board, Office of Human Resources, *State of South Carolina Workforce Plan Addendum*, April 2003. Available online at www.state.sc.us/ohr/workforce01/workforce2002.pdf; accessed March 1, 2004.
- , Workforce Planning Agency Data Resources Toolkit, June 2000. Available online at <http://www.state.sc.us/ohr/recruitment/wfoverview.htm>; accessed March 1, 2004.
- Sullivan, John, "Why You Need Workforce Planning," *Workforce*, Vol. 81, No. 12, 2002, pp. 46–50.
- U.S. Department of Defense (DoD), *Civilian Human Resources Strategic Plan*, Washington, D.C.: Office of the Under Secretary of Defense (Personnel and Readiness), 2003b.
- , *Civilian Human Resources Strategic Plan Annex B: FY 03 Year of Execution Plan*, Washington, D.C.: Office of the Under Secretary of Defense (Personnel and Readiness), 2003c.
- , *The Defense Transformation for the 21st Century Act*, Washington, D.C., April 10, 2003a.
- , "Interim Policy and Procedures for Strategic Manpower Planning and Development of Manpower Estimates," Memorandum, Washington, D.C.: Under Secretary of Defense (Personnel and Readiness), December 10, 2003d.
- U.S. Department of Health and Human Services, *Building Successful Organizations: Workforce Planning in HHS*, Washington, D.C., November

1999. Available online at www.hhs.gov/ohr/workforce/wfpguide.html; accessed March 1, 2004.
- U.S. Department of Transportation, *Workforce Planning and Professional Development Task Force Final Report: Positioning FHWA for the Future*, Washington, D.C., December 1, 2000. Available online at <http://www.fhwa.dot.gov/reports/workforce/>; accessed May 20, 2005.
- U.S. General Accounting Office (now U.S. Government Accountability Office), *DoD Civilian Personnel: Comprehensive Strategic Workforce Plans Needed*, Washington, D.C.: GAO-04-753, 2004.
- , *DoD Personnel: Documentation of the Army's Civilian Workforce-Planning Model Needed to Enhance Credibility*, Washington, D.C.: GAO-03-1046, 2003. Available online at <http://www.gao.gov/htext/d031046.html>.
- U.S. Office of Budget and Management, *Circular No. A-76 Revised Supplemental Handbook: Performance of Commercial Activities*, Washington, D.C., March 1996. 2003 revision available online at http://www.whitehouse.gov/omb/circulars/a076/a76_rev2003.pdf; accessed January 4, 2006.
- U.S. Office of Personnel Management, "EHRI." Available online at http://www.opm.gov/egov/EHRI_overview.asp; accessed June 6, 2005.
- , "Workforce Planning." Available online at http://www.opm.gov/workforceplanning/WASS_CIVFORS.asp; accessed May 20, 2005.
- Virginia Department of Human Resource Management, *Workforce Planning: Commonwealth of Virginia*, Richmond, Va.: Department of Human Resource Management, April 2003. Available online at www.dhrm.state.va.us/workforceplanning.html; accessed March 1, 2004.
- Washington State Department of Personnel, *State of Washington Workforce Planning Guide*, Olympia, Wash., December 2000. Available online at www.wa.gov/dop/workforceplanning; accessed March 1, 2004.
- The White House, President's Management Agenda, Washington, D.C., 2001. Available online at <http://www.whitehouse.gov/results/agenda/fiveinitiatives08.html>.

Zellman, Gail L., and Susan M. Gates, *Examining the Cost of Military Child Care*, Santa Monica, Calif.: RAND Corporation, MR-1415-OSD, 2002.