Innovative Workplaces:
Benefits and Best Practices

January 2006

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Foreword

The U.S. General Services Administration (GSA) is pleased to issue *Innovative Workplaces: Benefits and Best Practices*, our latest publication focused on advancing innovative workplace strategies in the Federal Government.

For years, GSA has promoted improved design and efficiency of Federal buildings, developing information and tools to help Federal agencies create innovative work environments. By designing innovative workplaces, the Federal Government provides agencies with the high-performance facilities they need to attract and retain talented, motivated employees.

This publication describes the value of improving facilities and work practices to create not only more efficient, but more *effective* workplaces—ones that offer increased benefits to all stakeholders, including building owners, managers, occupants, and the American public. Innovative workplaces are achieved through a holistic, integrated approach to development—balancing business strategies, short- and long-term costs, and occupant performance. Using this approach, workplaces are more efficient, flexible, and sustainable—thereby offering the best value to stakeholders.

I would like to thank both the GSA Office of Governmentwide Policy's Office of Real Property Management and the GSA Public Buildings Service's Office of Applied Science for providing the insights presented in this document and helping to improve our facilities' value and workforce quality. GSA believes innovative workplaces are important to the continued success of the U.S. Government. I hope you will find this publication enlightening and useful.

John Sindelar
Acting Associate Administrator
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U.S. General Services Administration

Preface

The words "United States Federal Government" and "innovation" are not often uttered in the same breath. But for nearly a decade, the work of the General Services Administration (GSA) – Office of Real Property Management and Public Buildings Service on innovative workplace strategies has helped dispel the image of government as slow and stodgy. GSA recognized that new approaches to designing and using Federal buildings—representing more than 3.4 billion square feet and occupied by more than 2.7 million employees—had the potential to not only generate billions of dollars in annual facility savings, but could also boost employee productivity and job satisfaction.

The role of the *place* where people work in government has never been more important, especially considering that over the next decade large numbers of Baby Boomers will start to retire—resulting in about 40 percent of current employees leaving the workforce. Using innovative workplace design strategies to create working conditions that will help attract young and talented people to government service is critically important. Understanding how physical design, information technology, and management practices can work in harmony to help the Federal Government become an "employer of first choice"—and do it in a way that is efficient and effective—is an extraordinary challenge.

Particularly remarkable about GSA's innovative approach to workplace design is that the agency adopted a commitment early on to pilot-test new design strategies for its own and other government departments, as well as evaluating innovative private sector initiatives. The results, reflected in this milestone report, *Innovative Workplaces: Benefits and Best Practices*, are guidelines that provide a roadmap for future workplace design grounded in credible data and tested by real-life experience of a diverse employee population. It is a singular achievement.

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Executive Summary

The Federal Government employs 2.7 million workers and owns or leases more than 495,000 buildings—3.4 billion square feet—worldwide. Unfortunately, most Federal office space suffers from poor workplace design and does not adequately support the increasingly collaborative work style of today's information-based workforce. The result: less productive and satisfied workers and higher costs due to inefficient space use.

Forward-thinking organizations of all sizes and across all industries have come to recognize that *innovative workplaces* can enhance employee and business performance—resulting in long-term cost savings and/or improved organizational performance. These companies have begun to tailor their workplaces to meet their particular needs. They are seeking ways to use their space and technology investments to enable rather than inhibit progress toward their objectives.[1]

Definitive industry studies prove that implementing innovative workplace strategies produces significant savings through (1) *leveraging investments in human capital*—to improve employee productivity, reduce absenteeism, and increase retention rates; and (2) *enhancing portfolio value* through reduced churn costs, energy consumption, and office space requirements. In fact, research shows that if improved workplace strategies were applied across the board to the entire Federal office space portfolio (comprised of 725 million square feet), the potential savings to the government could be as much as **$8.4 billion annually**. Applying this same potential formula for savings to all Federal space types (3.4 billion square feet) could ostensibly produce savings near **$39 billion annually**.

To help Federal agencies realize these financial and productivity benefits, the General Services Administration (GSA) actively promotes and espouses innovative workplace strategies, tools, and techniques. After years of conducting extensive workplace research and tracking industry-wide best practices, we have found that simple workplace changes can significantly improve Federal employee performance and operating costs.

This milestone workplace publication by GSA's Office of Governmentwide Policy (OGP) identifies key workplace trends; discusses the history, background, and current state of the Federal workplace; and outlines the benefits of innovative workplace approaches. Numerous case study examples are provided to demonstrate the appeal of workplace strategy across industries—with a strong focus on successful Federal implementations—and varied financial and productivity benefits. The case studies summarize best practices and provide guidelines that can be applied by the reader to his or her unique workplace situation.

As innovative workplaces continue to become more mainstream among U.S. businesses, GSA encourages all Federal agencies to assess their workplace strategy and look for opportunities to implement innovative workplace concepts in an effort to improve Federal employee and agency performance.

> *Innovative workplaces are work environments that support organizational change, incorporate integrated and sustainable approaches, and improve employee performance—increasing business performance and reducing long-term operating expenses.*

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1   Schriefer, A.E. (2005).
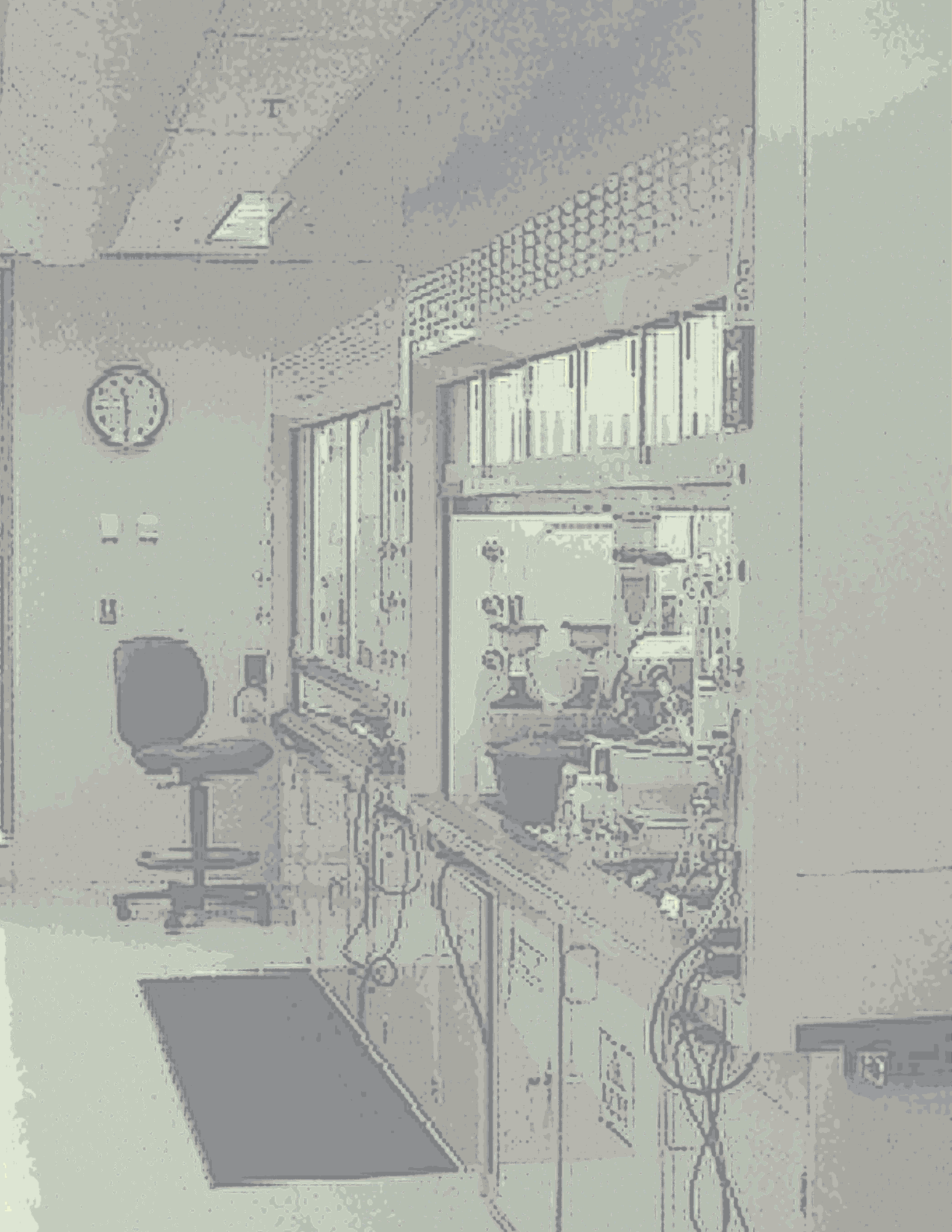
Section 1: Introduction

1.1 The Workplace Context

"The work environments that companies have provided for the past half-century are increasingly unsuited to emerging patterns of work and are inhibiting workers from performing to their full potential." [2]

In today's highly competitive global business environment organizations are increasingly revisiting their workplace strategies. Why? Because fixed office space and inflexible work arrangements provide little or no value to most organizations. Flexible workplace strategies are required to accommodate the rising mobile workforce. Today's generation of workers expects adaptable office environments with high-tech features. Collaborative office environments are also on the rise, as team- and project-based work is becoming the predominant work style.

All these workplace pressures, accompanied by continual advancements in technology, are transforming work patterns and creating the need for more innovative workplace strategies. The workplace today needs to accommodate rapid organizational changes and more progressive work styles and cultures. A more complex formula of workplace is evolving:

Work Strategies + Space + Culture = Workplace

As defined by Audrey Schriefer, a leading workplace expert, workplace strategy is "the dynamic alignment of an organization's work patterns with the work environment to enable peak performance and reduced cost." In *The Agile Workplace* Bell and Joroff estimated, based on survey data, that only five percent of

U.S. corporations use space as a strategic tool.[3]

To offer the best value in today's chaotic work environment, workplaces must go beyond simple function and aesthetics to become a *strategic business tool* that supports emerging work practices and organizational culture.

1.2 Why the Workplace Is Important to the Government

The Federal Government spends more than $20 billion annually on acquiring or substantially renovating Federal facilities. Furthermore, Federal workplace decisions affect the performance of 2.7 million workers representing more than **$195 billion in salaries and benefits**. Because employees account for the majority of an agency's expenses[4], the workplace's impact on employee productivity has been widely studied and acknowledged as a significant contributor to employee satisfaction.

According to a two-year workplace study by DYG Inc. for Knoll Inc., consisting of 1,500 interviews with 350 full-time office workers, people increasingly believe the workplace affects their productivity and job satisfaction.[5] The employees surveyed cited the following factors as having a "major" or "moderate" impact on their performance and satisfaction:

> *The workplace, and the world of work, is experiencing an upheaval and transformation as profound as that created by the printing press in the 15th century.*
>
> CoreNet Global 2010 Report

> *Current research shows, and leading businesses agree, that the workplace significantly influences employee satisfaction, health, hiring, retention, and productivity.*

2   Schriefer, A.E. (2005).

3   Bell, M. and Joroff, M. (2002). *The Agile Workplace: Supporting People and Their Work*.

4   The Federal Facilities Council and other studies show that over the typical life of a facility, employees account for 80 to 90 percent of the expenses, while building construction and maintenance expenses come in a distant second. This statistic means that if organizations do not consider the effect of workplace solutions on their employees, they are ignoring the effects on their largest cost center and missing the greatest opportunity for improved benefits and savings.

Major Impact

- *Technology* – providing the right technological tools and support to work effectively.
- *Storage space* – supplying ample storage within close proximity to their desk.
- *Climate control* – allowing employees to control the workplace climate to provide comfort.
- *Quiet space* – minimizing noise that causes distractions and disruptions.
- *Adjustable and adaptable space* – supplying space that can be personalized to fit an individual's work style.

Moderate Impact

- Personal lighting control
- Ergonomic equipment and chairs for physical comfort
- Proximity to exterior windows, providing natural light and views
- Privacy and space for personal items at the workstation
- A visually appealing workplace with a professional atmosphere

The study also showed that satisfaction is crucial to staff retention. Employees planning to leave the organization were 25 percent less satisfied with their physical workplace than those who planned to stay. Similar research studies have revealed that when employees do not have control over their individual work environment (e.g., lighting, ergonomics, and quiet space), it negatively affects their physical health and mental disposition leading to increased absenteeism, employee dissatisfaction, inferior work products, and unsatisfactory customer service.[6]

Such studies make clear that failing to provide space, systems, furniture, and technology that optimize occupants' performance can have detrimental long-term effects—reducing the organization's performance and increasing operational expenses. All else being equal, people will more often choose to work for organizations that provide better workplace accommodations.

By analyzing and conducting numerous workplace studies and research programs like these, GSA has found that innovative workplace solutions are vital to the success of the U.S. government, its employees, and its citizens. However, there are numerous challenges inherent in today's Federal workplace environment that must be recognized before new strategies can be assessed and adopted.

1.3 The Current State of the Federal Workplace

Despite continuous improvement efforts, the Federal office portfolio still shows signs of poor workplace design. Space is sometimes designed using old criteria—or not designed at all—or may be designed based on outdated concepts that do not adequately support the changing needs of today's information-based workforce. Such work settings make it difficult to incorporate new approaches and reduce operating costs.

The following poor workplace conditions can adversely affect employees in Federal office buildings:

- *Space as status* – Space is assigned based on status rather than the type of work completed in the space.
- *Indoor Air Quality* – Poor indoor air circulation can lead to people feeling lethargic or having eye, nose, and throat irritations.
- *High churn cost* [7] – Significant time, cost, and effort is required to reconfigure space to match organizational changes.
- *Environmental complaints* – People complain about noise and odors or being too hot or too cold.

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5   DYG, Inc., 1998
6   GSA (2001b). Productivity and the Workplace: Featuring the Productivity Payback Model.
7   Churn costs are defined as the cost required to relocate personnel and equipment, whether it is moving down the hall, to another building, or across town.

- *Outmoded technology* – Outdated or aging phone and computer systems impact productivity in the workplace, as well as the ability to work from remote locations.
- *Nagging service calls* – Building management responds to emergency repairs or repetitive maintenance calls on a frequent basis.
- *Anonymous space* – It is difficult to locate other employees within the building; the workspace lacks variety and has no focal points.

Figure 1 illustrates characteristics of poor workplace design; including lack of natural light (the high cubicle dividers do not allow daylight to pass through to interior spaces), fixed workstation panels, and a narrow circulation pattern which makes teaming and collaborative work difficult.

Another challenge facing Federal workplace improvements is the fact that most Federal managers do not yet view the workplace as a strategic business tool. For example, each year Federal agencies ask GSA to provide millions of square feet of new office space requirements. Until recently, agencies would ask GSA to play the role of order-taker only, giving the agencies what they asked for without considering how workplace budgets could be leveraged to improve employee and business performance. This paradigm began to change in the 1990s.

In response to these and other Federal workplace challenges, and recognizing the strategic importance of the workplace within the organization's asset management, the President enacted Executive Order (EO) 13327, Federal Real Property Asset Management, in 2004. The EO called for each Federal agency to establish a senior real property officer position and participate on the Federal Real Property Council (FRPC) to promote the efficient and economical use of Federal real property resources. The EO encourages "enhancement of Federal agency productivity through an improved working environment."

> *In the traditional "old school" perspective, the workplace is viewed solely as a physical container for work.*

Three agency stakeholders have come together to support the EO and drive Federal workplace change:

1. *The Office of Management and Budget (OMB)*, whose mission is to ensure Federal funds are appropriately used and that agencies get the best value for taxpayers' dollars. OMB chairs the FRPC in support of EO 13327.

2. *The Office of Personnel Management (OPM)*, which plans for workforce succession. OPM is concerned about recruiting and retaining talented personnel and providing acceptable work coverage through alternative work strategies such as telework.

3. *The Government Accountability Office (GAO)*, which is concerned with the condition of the Federal infrastructure, the magnitude of deferred maintenance, mitigation of threats that could damage the infrastructure, and maintaining continuity of operations.

GSA is responsible for responding to these important stakeholders, providing the tools and guidance Federal agencies need in order to meet the EO's requirement of enhancing agency productivity.

Figure 1
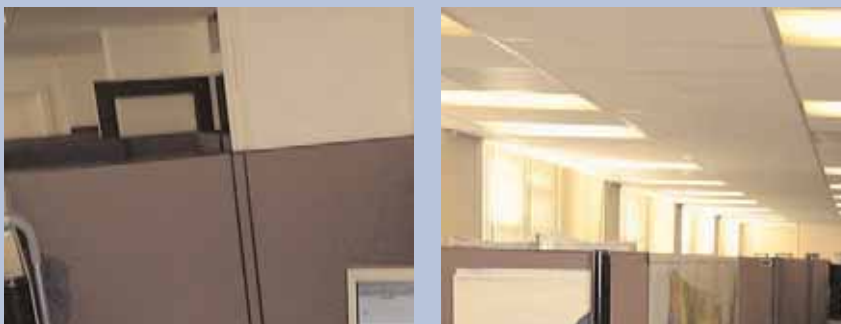
The History of Federal Workplace Initiatives

Important events and laws throughout history have influenced the Federal workplace, leading to the current Federal workplace environment. These include:

1895

The Pension Building (today's National Building Museum) was designed with better access to natural light and increased air circulation, improving working conditions for the Federal workers serving the Civil War veterans.

1930s

Construction began of new monumental government office buildings, later called the **Federal Triangle,"** providing beautiful facilities to reflect the value shown to Federal employment.

1949

The **Federal Property and Administrative Services Act of 1949** (also known as the Property Act) was passed to "increase the efficiency and economy of Federal operations regarding the procurement, utilization, and disposal of property." It also established the General Services Administration (GSA) to oversee this work.

1957

The Comptroller General approved payment of salaries, on a case by-case basis, to Federal employees for work done at home. This marked the very first step toward an organized Federal **telework movement**, officially launched in 1973.

1960s

The Herman Miller Company developed the Action Office furniture system marking the advent of **open-plan office design** and systems furniture.

1973

Jack Nilles, the father of telework and a consulting rocket scientist to the U.S. Air Force Space Program, coined the terms "telecommuting and "teleworking. He began promoting the value and importance of telework and thus gave birth to the telework movement.

1974

The Federal Assignment and Utilization of Space Regulations requires space to be assigned based on salary or employee grade.

1990

The **Telephone Bill**" allowed Federal agencies to pay for extra telephone lines, related equipment, and fees needed to work at home.

| 1895 | 1930s | 1949 | 1957 | 1960s | 1973 | 1974 | 1990 |

1991

Revised **Federal Assignment and Utilization of Space Regulations** set a maximum office space utilization rate of 125 sf per person, with 22 percent support space, for a total maximum of 152 sf per person. Federal telework guidance and the first governmentwide Flexiplace programs were developed.

1998

GSA s Office of Governmentwide Policy inaugurated the **Integrated Workplace Program**, which recognized the importance of the workplace on performance and promoted a more strategic approach to developing workplaces.

1999

Executive Order 13123, "**Greening the Government through Efficient Energy Management** called for sustainable design principles in Federal real property projects.

2000

Public Law 106-346, Section 359, required agencies to make telework available to an increasing percentage of eligible employees and set goals for participation.

That same year, **child care subsidies** became available for lower income Federal executive agency employees, recognizing the need for more "family-friendly" work arrangements.

2001

The revised **Federal Assignment and Utilization of Space Regulations** called for space assignments to be based on program need and best value rather than grade status and square-footage mandates.

2002

The launch of GSA s Public Buildings Service's **WorkPlace 20•20** Program was created to provide a process for developing workplaces from a strategic perspective that supports organizational effectiveness.

2004

Executive Order (EO) 13327, **Federal Real Property Asset Management,** called for each Federal agency to establish a senior real property officer position and participate on the Federal Real Property Council to promote the efficient and economical use of Federal real property resources. The EO encourages enhancement of **Federal agency productivity through an improved working environment**"— officially recognizing the importance of the workplace in an organization s asset management.

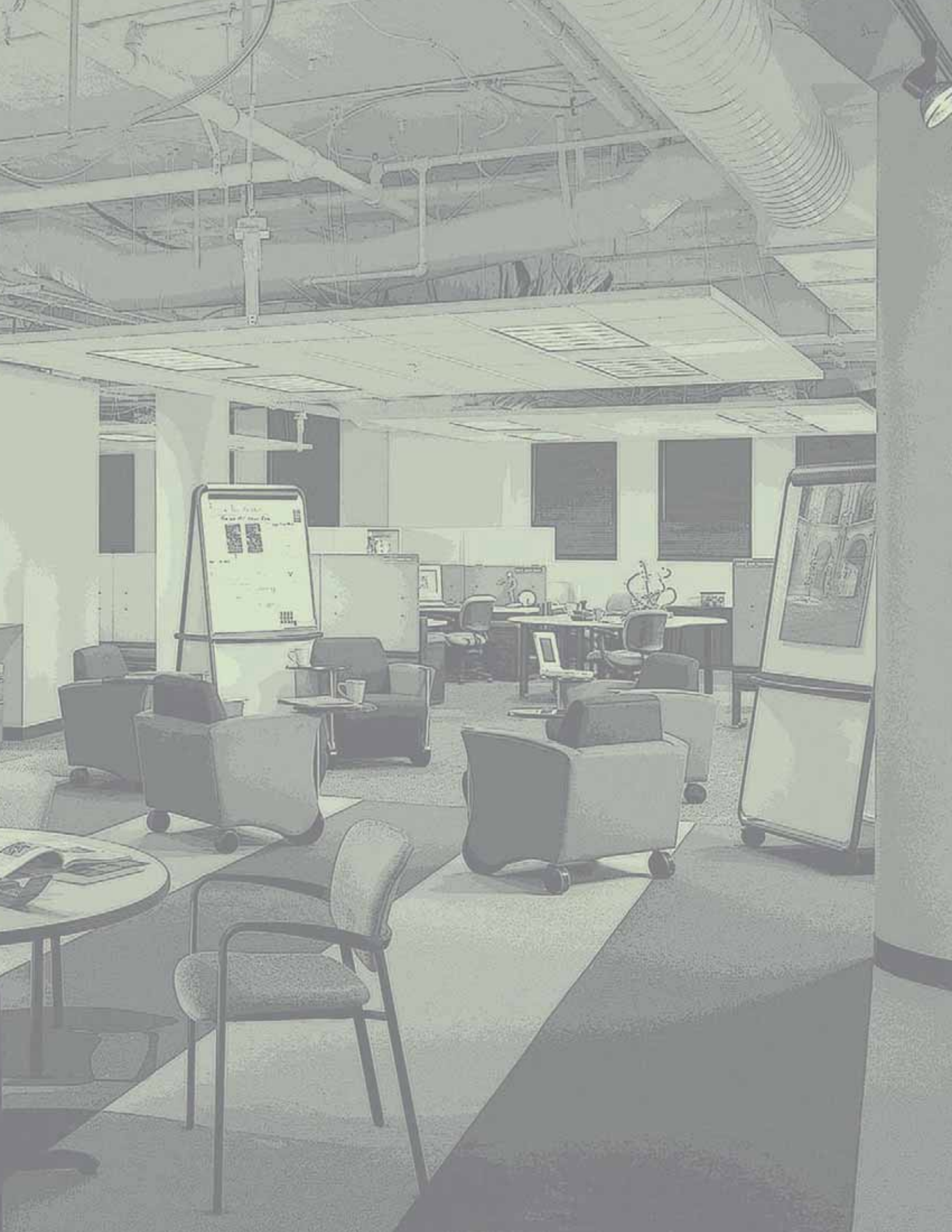| 1991 | 1998 | 1999 | 2000 | 2001 | 2002 | 2004 |

Section 2: Defining Innovative Workplaces

2.1 What Are Innovative Workplaces?

Innovative workplaces are cost-effective, flexible, and sustainable work environments that support organizational change and collaborative work styles. The end goal of an innovative workplace is to provide high-performance work environments that maximize employee productivity and reduce long-term operating expenses.

Successful workplaces can only happen when executives, managers, designers, and employees all actively participate in developing and owning the workplace.

Designing innovative workspaces requires *new ways of thinking* about the physical and virtual aspects of the space—tying together people, space, and technology to support changing (and more progressive) business practices. This approach requires an integrated development process, balancing business strategies, short- and long-term costs, and occupant performance. During this process, organizations must collaborate closely with all parties affected by workplace decisions— including building owners, designers, facility managers, leasing experts, and occupants. By using this integrated approach, workplaces are more effective and offer the best value to all stakeholders.

To further define and understand innovative workplaces, GSA identified specific workplace characteristics, termed the "Hallmarks of the Productive Workplace:" *spatial equity, healthfulness, flexibility, comfort, technological connectivity, reliability, and sense of place.*

2.2 Characteristics of Innovative Workplaces

To be an effective strategic tool for the organization and serve varying occupant needs, workplaces must incorporate the GSA Hallmarks of the Productive Workplace. These characteristics are described in detail below.

Spatial Equity

A humane, well-designed workspace that meets the user's functional needs and provides individual access to privacy, daylight, outside views, and aesthetics.

This concept means that all workers have the space, equipment, and support they need to excel at their job, with equal access to important workplace elements, such as natural light, outside views, and space to talk privately. Organizations can no longer ring the outside of a building with private offices, cutting off natural light and views to people sitting inside, and expect them to perform at their best.

Healthfulness

Clean and healthy work environments with access to air, light, and water— and free of contaminants and excessive noise.

Construction materials, furniture, office equipment, and cleaning products/processes can add harmful contaminates that pollute the indoor air. Liberal amounts of fresh air must be provided to the space when occupied, and ventilation systems must be designed, tested, and maintained to ensure good air quality.

9

Alternate work strategies include telework, hoteling, virtual offices, and other distributed work arrangements. Telework is currently the most popular of these strategies. As defined by GSA and the Office of Personnel Management in 2005, telework is: "The act of performing all or a portion of work functions at an alternate work site under circumstances which reduce or eliminate the employee's commute. It must occur at least one day per week on a recurring basis."

Flexibility

Easily adaptable workplaces that support varied work strategies and help balance an individual's work and home life—including systems and furnishings that accommodate organizational change with minimal time, effort, and waste.

Easily reconfigured infrastructure and furniture, including freestanding work surfaces, mobile storage units, modular walls, and access floor systems—to distribute power, data, and air— are leading examples of flexible systems.

Flexible work strategies, such as flex-time, job sharing, and telework programs, allow employees to work how, when, and where they are most productive—contributing significantly to employee satisfaction and work-life balance.

Comfort

Occupant-adjustable temperature, ventilation, lighting, acoustic, and furniture systems providing personal and group comfort.

Allowing people to control their workspace goes a long way toward satisfying their needs and reducing complaints. Providing furniture and task lighting that occupants can reconfigure to suit their work needs, and giving them the ability to adjust lighting levels, temperature, and ventilation within the personal workspace will result in more satisfied and productive employees.

Connectivity

A robust communications system providing access to people and/or data from any place, at any time.

"Follow-me/Find-me" technology (enables callers to find you wherever you are by dialing

just one number), wireless voice and data technology, and virtual networking (logging into your company's network from any location) are examples of advanced communications systems that improve employee productivity.

Reliability

Efficient and state-of-the-art building, security, computer, and telecommunication systems that are easy to maintain.

Providing heating, ventilation, air conditioning, lighting, power, security, telecommunication systems, and technology equipment that provide reliable service with minimal disruptions.

Sense of Place

A workplace that has a unique character, with an appropriate image and identity, instills a sense of pride, purpose, and dedication for the individual and the workplace community.

One test of workplace success is whether the space would pass the "relative test." Would most of the occupants be proud to bring in family and friends and show them where they work? If not, the workplace has not yet achieved an appropriate sense of place for the people using it.

It is good to add some recreational amenities in the workplace, such as a television lounge (that doubles as an informal meeting area), informal seating or lunch areas, or a small area with a pool or ping-pong table. Consider providing some areas that incorporate color and direct sunlight to warm up neutral tones typically used in office furniture.

2.3 The Sustainable Workplace

In addition to accommodating employees and the organization, innovative workplaces must accommodate *the environment*. Combining the concepts of sustainable design, development, and maintenance produces a

"sustainable workplace" that:

- Respects the environment
- Improves health and performance
- Maximizes human capital
- Supports an efficient organization
- Makes the best use of resources

The features and benefits of sustainable workplaces can be defined within the context of three main categories:

1. **Sustainable planning, design, and construction:** Eliminates toxics, minimizes or eliminates waste, reduces contingent liability, increases safety and proficiency, and creates long-term value.
2. **Sustainable repair and alteration:** Abates hazardous materials, reduces churn costs, and provides healthier environments.
3. **Sustainable operations and maintenance:** Increases occupant health and safety, prolongs the life of building finishes and systems, and uses healthier, eco-friendly products and procedures. Investing in high-quality systems maintenance extends equipment life and maximizes efficiency.[8]

A powerful concept for creating "world-class" workspace, sustainable workplaces provide the most effective work environments

> *"A guiding principle of sustainable design is to create places that are not only healthy and productive, but which also lift the human spirit. The premise is a simple one: healthy, happy people will be more productive and more engaged with their work and their organization."*
>
> Dr. Judith Heerwagen
> Environmental Psychologist
> J.H. Heerwagen &
> Associates Inc.

and strategies at the lowest life cycle "true" cost. When sustainable workplace concepts are integrated with an organization's mission, the organization can make decisions that benefit the project constituents, the environment, and the bottom line. The following key qualities are found in a sustainable workplace:

- **Integrated design process** – focused on adaptability and mobility, environmental issues, ergonomics, collaboration, privacy, and noise control.
- **Healthy environment** – with more daylight, outside views, and fresh air.
- **Flexible systems** – such as ergonomic equipment, chairs, and keyboards; flexible monitor location; and moveable task lighting.
- **Occupant control** of lighting, heating, and cooling systems.
- **Alternative work strategies** – including telework programs and centers, desk-sharing, touchdown space, and remote information access.
- **Flexible workplace strategies** – such as community space and ample private space; cell phones and laptops.

Integrating sustainable workplace features with the Hallmarks of the Productive Workplace results in an innovative workplace approach that not only creates a healthy and productive work environment but also delivers *significant additional benefits* to the Federal Government and other organizations. The next section explores these benefits in more detail.

> *Increased sensitivity to sustainability is another trend that will increasingly shape the nature of work, as companies begin measuring success—and making operational decisions—in terms of economic, social, and environmental parameters..*
>
> CoreNet 2010: The Changing Nature of Work and the Workplace.

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8   For more detailed information on the Sustainable Workplace, refer to GSA's Innovative Workplace Strategies publication. (2003b).

Workplace, Continuity, Telework, and Change
(*An Excerpt*)

By Wendell Joice, PhD, and Tony Gill

I. ORGANIZATIONAL CHANGE

Fundamental changes in the workplace are happening today and are driven by a number of factors such as improvements in communication technology, the need to address inefficient management structures, and the desire to better manage risk. This is all taking place at a time when cost efficiency and competitiveness are paramount.

One of the more powerful factors impacting our early 21st century culture of work is the continuing explosive development of technology and the consequent revision of workplace attitudes and operations. The advance of technology has spawned a new generation of entrepreneurs who don't need suits, ties, and standard office space to compete successfully in business. Their success has been a key catalyst in changing fundamental work patterns in many organizations. Not only did they eliminate the nine-to-five, five-day week in favor of an entirely new system of time management, they used the tools of new technology to change the way work was done. This has become an indelible blueprint for success across a wide spectrum of industries.

In the midst of these changing dynamics is the move toward telework. Telework is both a cause of the changing dynamics as well as a result. As a cause, telework plays a key role in each of the change factors mentioned above. Telework facilitates the increased and improved utilization of technology, enables globalized service provision, and enhances the feasibility of adequate risk management. On the other hand, improved technology, globalization pressures, and risk management needs have all resulted in an increased focus on telework. Telework has begun to play an increasingly critical role in the changing dynamics of today's workplace.

II. REASONS WHY ORGANIZATIONS ARE ADOPTING TELEWORK

Early deployments of telework were significantly slowed by an institutional resistance-to-change management culture and, also, by the limited capability of technology. Even during much of the 90s the telework toolkit didn't expand to much more than a dedicated phone line, a modem, a fax machine, and perhaps a stack of file folders. Given these limitations, as well as its perpetual label as an "ongoing special project," telework had difficulty in gaining the traction necessary to move forward.

During the past couple of decades, numerous public and private entities have been

unsuccessful in their attempts to sell telework, mainly because they lacked a catalyst to make telework an operational imperative and overcome change resistance. For many organizations and industries, however, that catalyst occurred on September 11, 2001. Since then, business continuity planning (BCP)—organizational strategies to maintain, reinstate, and/or shield necessary operating functions, systems, processes and personnel when work is disrupted and/or threatened by emergency circumstances—has assumed a significant role.

Based on the increased need to manage organizational risk in an era of increased risk due to threats of terrorism, technology sabotage, and/or other disruptive events, BCP and risk management have become strong incentives for the increased adoption of telework. Through the use of telework, organizations can manage risk by creating dispersed workplaces that don't concentrate human capital and other organizational infrastructures in one location. Risk management, however, is not the only emerging driver for telework adoption. Other important drivers include:

- **Cost Management:** Telework is a key contributor in lowering operational overhead as it enhances workplace productivity and cost efficiency of operations.

- **Facility Management:** Telework is an integral component in enhancing the efficiency of facility management. It can provide substantial cost efficiencies, improve utilization rates, and drive development of sustainable buildings.

- **Decentralization:** Telework supports the trend toward organizational decentralization as a solution to factors such as urban sprawl, overburdened transportation infrastructures, and rising fuel prices. Telework leads to reduced commuting times, traffic congestion, and air pollution.

- **HR Considerations:** Telework expands (geographically and sociologically) an organization's labor pool and improves recruiting and retention, leading to enhanced employment opportunities.

Keeping Pace with Technology: Organizations need to keep pace with rapidly changing organizational and technological processes. Telework strategies keep the organization current with the most recent technology advances such as videoconferencing, Web casting, Web-based Intranets, and virtual presence.[9]

Knowledge Work Facilitator: Telework is an effective tool for knowledge-based work; it can facilitate a high degree of knowledge sharing and worker productivity.

III. TELEWORK-ORIENTED WORKPLACE CONTINUITY/CHANGE STRATEGY

Putting this all together, it can be seen that telework is a key **workplace continuity and change strategy**:

It is a strategy for reconfiguring organizational structures and functioning to align with the principles and benefits of decentralization, sustainable development, business

9   For more information on the growing use of virtual presence, see the work being conducted by the Congressionally-funded Telework Consortium at www.teleworkconsortium.org.

continuity, alternative workplaces, management by results, and evolving workplace technology.

Given the circumstances cited above, telework-oriented workplace continuity/change strategies have reached the top of the list as the most effective way to address contemporary organizational concerns. In addition to the foundational changes identified previously, however, there are a number of other reasons why telework strategies make more and more sense, including:

- **Lifestyle Considerations.** Employers need to accommodate the more fluid lifestyles of employees, including a better work/life balance. The increased strain on families to maintain a balanced lifestyle and handle dependent care responsibilities can be positively addressed through telework arrangements.

- **Environmental Concerns.** Urban sprawl creates drastically increased commuting times which lead to:

  - Increases in work-related stress and other health-related problems

  - Reductions in productivity and quality of work-life

  - Increases in fuel prices and other work-related expenses

  - Increases in air pollution, traffic congestion, and inefficient energy consumption

  Telework can achieve dramatic decreases in commuting times and distances, and the resultant environmental concerns.

- **Organizational Flexibility.** Increased flexibility is a key benefit of adopting telework strategies. If planned well, they create seamless connections between central and remote alternative workplaces and, thereby, facilitate organizational benefits from flexible workplaces. Flexible workplaces equip workers with a better ability to adapt to personal and organizational changes (e.g., moves, team assignments, reorganizations).

  Given the amount of organizational change already underway and projected over the coming years, a transitional strategy like telework makes good sense.

- **Economic Development.** As knowledge work becomes more decentralized, creating flexible workplaces provides the additional benefit of being a catalyst for a wide array of economic development opportunities for communities of all types, from urban metropolitan areas to rural and/or economically depressed areas.

IV. CHALLENGES

While the mainstreaming of telework strategies is still stymied by resistance-to-change management, there are other implementation and cultural challenges that must be addressed. These include:

Work/Management Behaviors
- Some teleworkers find it difficult to work in isolation, while still remaining productive or creative.

- Monitoring and preventing the negative impact on career due to an "out of sight, out of mind" management attitude.
- Resolving issues of managers that experience telework as a disabling loss of control and/or oversight.
- Training managers how to manage by results.
- Ensuring that telework programs create alternative workplace arrangements for managers.

Building and Technology Strategies
- Establishing "smarter" central and/or backup IT systems (especially remote access) in the event of a large-scale power outage or other disruptions.
- Creating secure and robust technology infrastructures. Planners must identify various levels of security and design methods that address network security and remote access to information.

Archaic Management Practices

Outdated management practices present a range of significant challenges that need to be overcome. Many managers, especially middle managers, have a deeply ingrained resistance to telework that is primarily based on the prevalence of the "command and control" management philosophy that is a holdover from 20th century industrial management and is fundamentally incongruous with knowledge work.

V. MOVING FORWARD

Despite the difficult and persistent challenges mentioned above, telework is growing steadily, albeit slowly. In order to expedite the mainstreaming of telework, organizations, policy-makers, program developers, and advocates need to take advantage of numerous lessons learned, treat the challenges seriously, and continue to boost awareness of and exposure to telework.

Reconfiguring the workplace is critical to the success and effective functioning of today's organizations. Adopting telework strategies will dramatically increase organizational flexibility and enable workers to more completely embrace the "work anywhere, anytime" mentality of many of today's knowledge-based business models and labor pools. In the process of doing this, many other benefits will be achieved—such as risk mitigation—through internally imbedded business continuity processes.

Section 3: Benefits of Innovative Workplaces

The three main benefits derived from the application of innovative workplaces are its ability to:

1. **Leverage investments in human capital** by increasing occupant comfort and satisfaction—leading to improved productivity, performance, recruitment, and retention, and reduced absenteeism.

2. **Improve portfolio value** through greater flexibility of building services, more effective space utilization, improved operations and maintenance, and greater customer satisfaction—increasing overall organizational effectiveness.

3. **Support strategic mission/business objectives** by clarifying goals and strategies, identifying performance measures to track continuous improvement, facilitating business process evolution, improving customer service, and supporting corporate stewardship.

This section points to conclusive private and public sector research results that have proven the qualitative and quantitative benefits of innovative workplaces. The benefits are discussed within the context of the three main benefit categories.

3.1 Qualitative Benefits

Examining the qualitative benefits of innovative workplaces provides insight on how these improved work environments can create happier, healthier, and more productive employees.

3.1.1 Leveraging Human Capital Investments

Studies show that innovative workplaces help leverage the investment in employees, who typically represent from 80 to 90 percent of total business operating expenses, by providing the following benefits:

- **Reduced absenteeism.** Healthier indoor environments reduce sick building symptoms and absenteeism. A Canadian study revealed that approximately one-third of employees' sick leave can be attributed to symptoms caused by poor indoor air quality. The same study found that communication and social support enabled by open office plans are strong contributors to healthy workplaces and lowered absenteeism.[10]

  According to a study by Carnegie Mellon University (CMU) for the Department of Energy (DOE), improving indoor air quality and providing natural light reduces illness and stress. The CMU study[11] showed that occupants closer to windows reported fewer health problems.

  In addition, a survey of three case studies by the Rocky Mountain Institute proved that better lighting and HVAC systems can reduce absenteeism from 15 to 25 percent.[12]

- **Improved recruitment and retention.** The workplace is a proven factor in hiring and keeping a world-class workforce, resulting in improved recruitment and retention rates and decreasing expenses to replace

A new breed of worker ("the knowledge worker") is emerging to provide the required creativity and innovation. These highly sophisticated workers will demand an environment that attracts them, satisfies their needs, and provides an incentive to stay (Schriefer, 2005).

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10 Charles, K. et al. (2004).
11 Advanced Building Systems Integration Consortium, Center for Building Performance and Diagnostics. (1995).
12 Romm, J.D., & Browning, W.D. (1998).

staff. Knoll reports that a Hay Group study found that half the people planning to leave their current employer were dissatisfied with their workplace, while only one-quarter of those staying were dissatisfied.[13] A study commissioned by the American Society of Interior Designers also found that 51 percent of employees surveyed said the physical workplace would impact their decision to leave their job.[14]

Similar studies show that employees are happier when they have control over how and where they work, resulting in a better work-life balance and higher retention rates. This finding is particularly important given that Boston College's Sloan Work and Family Research Network found that 54 percent of the current workforce is part of a dual-earner couple—meaning that employees are increasingly responsible for caring for children and parents.[15]

- **Increased productivity and performance.** Flexible, adaptable work settings allow people to customize their workspace to suit their individual needs, providing improved comfort. When given control over their environment, workers are less distracted and more productive and satisfied with their jobs. They also report fewer complaints to building management. For example, Public Works and Government Services Canada found that when people were given individual ventilation control, the number of trouble calls decreased significantly.[16]

Healthier, more ergonomic workplaces can also improve performance and reduce expenses. The Occupational Safety and Health Administration (OSHA) reports that repetitive strain injuries caused by poor ergonomic design, including computer use, cost business and industry as much as $54

billion annually in workers compensation and other costs.[17] A National Institute of Safety and Health (NIOSH) study found that installing ergonomically designed furniture reduced health complaints by 50 percent and increased productivity by 23 percent.

In addition, effectively planned work spaces allow workers to interact on an informal basis as needed, increasing collaboration, teaming, and social ties, which can create more cohesive groups and more creative problem solutions. Research has shown that supportive co-worker relationships help people in dealing with stress.[18] Herman Miller found that enabling teams to collaborate and share information improved work group process quality by 3 percent and decreased project cycle times.[19]

3.1.2 Enhancing Portfolio Value

Facility operations and maintenance costs are a significant company expense—typically 10 to 20 percent of personnel and building costs—and are easy to quantify and track. Innovative workplace and building design helps increase the value of an organization's real estate portfolio through:

- **Greater flexibility of building services.** Improved flexibility in workplace design reduces the time and expense required for reconfigurations and daily operations and maintenance. The GSA Adaptable Workplace Lab showed that using easily reconfigured furniture can save 90 percent of reconfiguration costs, and reduce reconfiguration time from days to hours. In another example, the Pennsylvania Department of Environmental Protection reduced average churn costs from $2,500 to $250 per workstation by using more flexible building and furniture systems in their high-performance green buildings.[20]

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13 Knoll & The Hay Group. (1998).
14 American Society of Interior Designers. (1999).
15 Sloane Work and Family Research Network. (2005).
16 Charles, K.E., et al. (2004).
17 Occupational Health and Safety Administration (OSHA), Department of Labor. (1999).
18 Charles, K.E., et al. (2004).
19 Gee, L., & Miller, H. (2003).
20 Toothacre, J., & Pennsylvania Department of Environmental Quality. (2001).

- **More effective space utilization.** Workplace strategies such as telework and hoteling support better space-use alternatives. The U.S. Patent and Trademark Office eliminated three floors of office space and saved $1.5 million per year in rent by incorporating telework and office sharing into its new building program.

- **Efficient operations and maintenance.** Innovative workplaces help decrease facility management, operating, and technology expenses. Vivian Loftness et al at Carnegie Mellon have compiled case studies that show that improved lighting efficiency and controls can save up to 40 percent in total building energy costs.[21]

- **Greater customer satisfaction.** Employee performance and satisfaction can also increase with improved workplace systems. For example, building management in the Alfred A. Arraj Federal Courthouse in Denver, Colorado, and the Capital One Headquarters Building in Fairfax, Virginia, both report fewer occupant heating and cooling complaints with the under-floor air distribution system compared to other buildings with ceiling-supplied systems.

3.1.3 Supporting Mission Objectives

Beyond human capital and portfolio value, approaching the workplace as a strategic tool can support and enhance the mission of the organization by:

- **Clarifying mission goals and strategies.** During the pre-design phase of an innovative workplace project, the team examines the organization's objectives and goals, giving the designer a better understanding of business operations. The GSA Office of Civil Rights discovered that staff involvement in its workplace design helped improve morale and functionality.

- **Identifying performance measures to encourage and track continuous improvement.** In determining how a workplace will perform, a balanced scorecard approach should be used to assess financial, business process, customer, and employee measures. At the University of Miami, implementing monthly performance indicators increased productivity by 109 percent in two years and improved the preventative maintenance completion rate from 40 to 90 percent.

- **Facilitating business process evolution.** With a better understanding of an organization's operations and performance measures, the workplace can serve as a catalyst for change and facilitate quick reconfigurations. One group in GSA's Portfolio Management division was able to change from individual cubicles to a more open, interactive space in only 90 minutes (see *Adaptable Workplace Lab Case Study*, section 6.14).

- **Enhancing product or brand image.** The workplace can make a positive statement to employees and customers. At GSA's Federal Supply Service (FSS) building in Fort Worth, Texas, the workplace team improved customer perceptions, brand image, and product expertise by using the workplace as a showcase for FSS products and vendors and by co-locating work groups in the same building.

- **Improving customer service.** Employees are more productive and happier when their work is adequately supported by their workplace. This positive attitude will affect their relationships with their customers and each other, and help them excel at their job.

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21 Center for Building Performance and Diagnostics. (2005).

3.2 Quantitative Benefits

The most important question remains: how could implementing innovative workplace strategies impact the Federal budget? To gauge an order of magnitude of the possible savings, GSA used the following 2001 and 2002 Federal space and employment statistics to determine the potential impact improved office space could have on the Federal budget:

U.S. Federal Government Statistics

- 3.4 billion square feet of space worldwide (includes building, land, and structures) used by Federal employees
- 724.8 million square feet of office space worldwide (24 percent of total Federal space) used by Federal employees
- $2.8 billion spent annually on office construction
- $71,760 spent annually, on average, per civilian Federal employee for salary and benefits
- 9.6 days of sick leave taken per year, on average, by each civilian Federal employee
- 6.8 percent turnover rate for U.S. government employees (2004)[22]

GSA Portfolio Statistics

Within the Federal portfolio of owned and leased office buildings managed by GSA there are:

- 1.1 million workers housed
- 334 million square feet of office space (45 percent of Federal Government office space)

GSA applied the results of reputable workplace research studies, simulations, and analyses to its own portfolio of managed Federal office facilities and found that improved workplace strategies could substantially impact the Federal budget. The results follow.

3.2.1 Leveraging Human Capital

Innovative workplace strategies can have the most significant budgetary impact on human capital costs. These include:

- **Reduced absenteeism** resulting in a cost benefit valued at $432 million annually. This figure is based on a 15-percent reduction in absenteeism confirmed by two studies.[23]
- **Higher staff retention** could save $187 million annually in expenses to replace staff. This figure is based on a modest assumption of a 10-percent higher retention rate due to better office environments, a 6.8 percent turnover rate for Federal employees; and the average cost of $25,000 to replace an employee (BIDS, 2003).
- **Increased productivity** can be valued at $2.4 billion annually. This figure is based on two studies showing that better control of workplace comfort conditions produces a 3-percent productivity increase.[24]

These personnel benefits yield a potential savings of approximately $3 billion per year, or about $2,700 per person for GSA building occupants.

3.2.2 Enhancing Portfolio Value

Annual portfolio cost savings delivered by innovative workplaces could include:

- **Reduced churn costs** of $379 million annually, if move costs were decreased by 80 percent. This statistic is based on average results from four project case studies[25] and 1 million workstations with a 30 percent churn rate. (Average private sector churn rates are 41 percent according the International Facility

22 Bureau of Labor Statistics. (2003). Job Openings and Labor Turnover Survey. U. S. Department of Labor.
23 The two studies referenced are: (1) Romm, J.D., & Browning, W.D. (1998)., and (2) Benton and Fountain. (1990).
24 The two studies referenced are: (1) Kroner, Stark-martin & Eillemain. (1992)., and (2) Wyon. (1996).
25 The four case studies references are from: (1) Lucent Project Atlas, (2) Pennsylvania Department of Environmental Protection, (3) GSA Adaptable Workplace Lab, and (4) Herman Miller MarketPlace.

Management Association and can be up to 300 percent for some organizations.)

• **Decreased electricity consumption** worth approximately $178 million annually. This figure is based on average energy costs of $1.62 per square foot[26] for GSA-managed facilities and three studies showing a 33-percent average reduction in total energy consumption by utilizing more efficient lighting strategies.[27]

• **Reduced office space requirements** saving $344 million annually based on 5-percent reduction in space requirements. GSA's Office of Real Property Management found that the combined effects of telework and hoteling reduced its own space requirements by 8 percent—without decreasing workstation size or group space needs—through decreased numbers of workstations.

The potential space cost savings are approximately **$901 million per year, or about $2.70 per square foot**, for the GSA-controlled office portfolio.

Combining the estimates provided for human capital and portfolio savings yields a potential savings of **$3.9 billion annually** for the 334 million square feet of GSA-controlled office space. Because the GSA inventory represents only 45 percent of the Federal Government's overall office inventory, the potential benefits of innovative workplaces for all U.S. government office space could be more than **$8.4 billion per year**. These savings taken to the next level and applied to the entire Federal property could potentially reach **$39 billion**. *See Table 1 for details.*

Given the significant potential value evidenced through these employee productivity and portfolio benefits, many organizations—particularly the Federal Government—should consider adopting innovative workplace strategies for their entire portfolio. The next section presents recommended steps for implementing an innovative workplace approach.

Table 1. Potential Federal Savings from Innovative Workplace Strategies

	GSA-Managed Office space	**All Federal Office Space**	**All Federal Property Space**
Square Feet Affected	334 Million SF	725 Million SF	3.4 Billion SF
Potential Human Capital Savings	$3 Billion	$6.5 Billion	$30.5 Billion
Potential Portfolio Savings	$901 Million	$1.9 Billion	$9.1 Billion
Total Potential Savings	**$3.9 Billion**	**$8.4 Billion**	**$39.6 Billion**

26 GSA Energy Usage and Analysis System. (2005). http://euas.gsa.gov.
27 Center for Building Performance and Diagnostics. (2005). "BIDS" Mid-year Report. Pittsburgh: Carnegie Mellon University.

Section 4: Implementing Innovative Workplace Strategies

There are several common elements necessary for every innovative workplace project; but the most important are **(1) using an integrated, sustainable approach and (2) involving all stakeholders** to determine appropriate workplace strategies. Determining project needs and goals—including existing problems and challenges—and planning for long-term management of the workplace is also important. For Federal customers of GSA, workplace strategies can be addressed by participating in the Workplace 20•20 program, linking space to organizational effectiveness.

4.1 Implementation Steps

The process of implementing innovative qualities in a workplace requires effort and serious, thought-provoking discussions. The broadly defined steps in the process include the following:

1. Ask questions to understand the organization and learn about industry innovations.
2. Determine the best processes (for your office) and available information.
3. Identify the correct tools.
4. Establish benchmarks; determine and calculate necessary measurements.
5. Partner with internal resources.
6. Create an internal pilot project before making major changes.

The following subsections describe issues to consider before implementing an innovative workplace approach in new or existing space.

Step 1: Ask Questions

It is important for the project team to spend time determining exactly what problems need to be solved in the beginning. Many topics and questions must be addressed before even considering the physical layout of space. Sample questions include:

- What is the current problem with the workplace?
- How does the organization operate and how can the workplace better address user needs?
- What is the competition doing?
- How does the organization link business processes with work strategies and space?
- How does the organization plan work spaces to address unknown future conditions?
- What does the organization not know?

Step 2: Determine the Best Processes

Determine the best processes for defining individual and organizational needs. Consider:

- Employee engagement
- Strategic planning
- Workplace strategies
- Change management
- Performance measurement

The organization's priorities and staff, time, and funding resources will determine the extent to which these issues come into play. Employee engagement will most likely play a significant role, but management will need to strategically review the process.

Step 3: Identify the Correct Tools

Identify tools that help to prioritize processes and gather the necessary information to inform design and implementation decisions. These tools might include:

- Implementation/integration models
- Balanced scorecard framework

- Survey instruments
- Diagnostic tools
- Performance metrics

Various survey instruments and performance metrics are available for this task. Each organization must determine which tool is most relevant and useful. GSA uses the Balanced Scorecard performance criteria in tracking pilot workplace projects in the WorkPlace 20•20 Program and has found it to be a useful tool for defining project results.

Step 4: Establish Benchmarks

Research benchmarks from relevant institutions and talk with stakeholders to determine how success should be measured. GSA has developed two effective benchmarking tools:

1. *The Cost per Person Model* has proven helpful in assisting customers in "what-if" planning for moves associated with lease expirations and owned building renovations. The cost per person is one of GSA's seven original government-wide performance indicators and continues to be a useful benchmark for Federal agencies. The model estimates the average cost per person in real estate (space usage), telecommunications, information technology (IT), and alternative work environment.

2. *The Productivity Payback Model* assists in customer relationship management by enabling users to relate productivity increases and employee turnover decreases to workplace improvements.

Both tools help to begin the planning process and make critical project decisions by assessing various workplace factors, rather than just facility performance. Organizations should recalculate these measurements often to ensure continuous improvement.

Step 5: Partner with Internal Resources

While facility professionals and executives must lead their organizations in creating effective workplace strategies, involving human resources (HR) and IT professionals is critical as well. Issues to consider for this step include:

- What do workplace and process strategies have to do with HR and IT?
- How does the organization utilize HR to facilitate employee involvement and minimize negative change effects?
- How does the organization work with IT to ensure it is implementing technology that addresses appropriate concerns?
- Who else should the organization involve to influence a smooth and successful process (e.g., organizational development, strategic workplace, and change management professionals)?

The project team should work with HR and IT experts to define project goals and identify precisely which problems need solutions. Because personnel issues surface regularly during corporate change, HR must also be fully informed and capable of handling management and staff communication, resetting a company's cultural momentum and responding to individual concerns. The IT professionals can help to determine hardware, software, and networking requirements, as well as issues with implementing telework strategies.

Step 6: Create a Pilot Project

Test your new workplace concept in a small-scale way to determine how effective it will be. Recommendations include:

- Start small
- Benchmark internally
- Review what was done correctly
- Learn from all mistakes
- Repeat the process until it is perfected
- Document all steps

By benchmarking internally, an organization will learn smarter implementation methods

for future innovations. It will build a strong methodology for how to move the organization forward. After the first implementation, organizations should hold a post-process review. Do not allow a few mistakes to discourage the team. Repeat the process until it is perfected, and document everything along the way.

While embarking on innovative workplace design, it is helpful to keep abreast of industry workplace trends and best practices. Numerous public and private organizations are adopting innovative workplace concepts that can inform and improve your individual workplace strategies. The next section provides an overview of innovative workplace programs and activities in the private and public sectors.

Section 5: Private and Public Sector Workplace Programs

5.1 Private and Public Sector Initiatives

Both private and public sector firms are moving toward innovative workplace strategies to increase the value derived from workplace investments. The real estate industry has always been fragmented and competitive, so a coordinated research program encompassing all the workplace stakeholders does not currently exist. But the magnitude of this issue has precipitated actions from a variety of organizations and industries, as follows.

Fortune 500 Corporations

Major corporations, such as Owens Corning, Lucent Technologies, Sun Microsystems, Cisco Systems, Deutsch Bank, Proctor & Gamble, and Nortel Networks, are always looking for a competitive edge and have turned to innovative workplaces to achieve it. Recognizing the value of business- and user-focused integrated systems approach to the workplace, these companies dedicate considerable resources to developing and maintaining workplaces that best support organizational needs. Descriptions and results of these and other workplace projects can be found in the case studies in section 6.

Suppliers and Designers

Product suppliers, space suppliers, and designers—who have always tried to fill the demand for property services—are examining the workplace more closely to determine underlying cause and effect relationships that will provide a more objective basis for justifying design decisions. Many industry players, including furniture manufacturers and design firms, are realizing the value of offering sustainable, or "green," solutions as

well as providing expertise on developing healthier and more productive environments based on a strategic business model.

Industry Associations

CoreNet Global, the professional association of real estate executives for Fortune 500 companies, recently completed an extensive research program titled *Corporate Real Estate 2010* (CoRE 2010). The CoRE 2010 research teams determined that "how and where work is performed is clearly changing due to internal and external business drivers. These business drivers are contributing to the creation of the networked virtual organization (NVO), which provides a flexible, mobile work environment based on connectivity, collaboration, and a paperless mindset." CoRE 2010 predicts the networked virtual organization will be the prevailing enterprise model in 2010, requiring commercial real estate managers to adopt new mindsets and practices surrounding workplace strategies. The program included eight research topics ranging from "The Changing Nature of Work and the Workplace" to "Sustainability and Corporate Social Responsibility."[28]

The International Facility Management Association, the American Institute of Architects, and the American Society of Interior Design are involved with in-depth workplace research as well.

Academic Institutions

Several of the country's top universities are deeply involved in workplace research and consider it an important topic for future research and development projects.

The Cornell University International Workplace Studies Program's current research examines the expense and value of co-locating business units, whether in a

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28   For more information on CoRE 2010, visit www2.corenetglobal.org/learning/core2010/index.vsp. There is a fee to obtain the documents.

single high-rise tower, a multi-building urban "campus," or a suburban campus. Past research includes "Managing Workplace Change," which examines a selection of workplace change management processes used in organizations around the world to learn how workplace changes are implemented, the cost of these efforts, and which aspects of the process most influence employee adjustment.[29]

The Carnegie Mellon University (CMU) Center for Building Performance and Diagnostics studies the impact of advanced technology on the physical, environmental, and social settings in office buildings, examining how the physical environment can improve occupant satisfaction and performance. In conjunction with private and public sector partners, CMU has developed the Intelligent Workplace Lab, written the Guidelines for High-Performance Workspaces, and created the Building Investment Decision Support (BIDS) database to catalog and analyze workplace-related research. CMU is currently developing the Building As Power Plant project to develop a facility that will produce more energy than it consumes.[30]

The Center for the Built Environment at the University of California, Berkeley, is conducting research and developing tools and guidelines to improve the design, operation, and environmental quality of buildings. Current areas of research include indoor environmental quality, HVAC systems, building envelope systems, and building information technologies. GSA and CBE, working with the firm DEGW, have developed the CBE/GSA/DEGW Workplace Quality Assessment Survey, a web-based tool that gathers workspace use and needs from all occupants during project planning and programming.

Other academic institutions conducting important work in this area include Georgia Tech, University of California-Berkeley, MIT, Harvard, and Johns Hopkins University.

Federal Agencies

Beyond GSA, many Federal agencies recognize and seek to capitalize on the strategic value of the workplace. These agencies include the National Institutes of Health, the Social Security Administration, the Coast Guard, the Naval Facilities Engineering Command, and the U.S. Environmental Protection Agency (EPA).

The U.S. Department of Energy (DOE) supports sustainable building design by identifying energy-efficient equipment and appliances and developing and promoting renewable energy sources for commercial, residential, and industrial structures.

EPA demands that its workplaces mirror its organizational goals, being healthy places to work that do not incorporate harmful materials and help to minimize environmental impacts. The agency has developed stringent guidelines to ensure its new facilities meet this goal.

5.2 GSA Workplace Initiatives

GSA leads and participates on numerous workplace teams, along with private companies, academia, other Federal agencies, and other nations, including the governments of Canada, the Netherlands, Germany, and Finland. Through independent and collaborative workplace research, GSA strives to develop tools and guidelines for improving the Federal workplace. A summary of these efforts follow.

5.2.1 GSA Workplace Programs

Since 1997, GSA has spearheaded several research projects focused on developing innovative workplace strategies for Federal real property. The projects are described in detail in this section.

WorkPlace 20•20

To pilot innovative workplace ideas, GSA's

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29 International Workplace Studies Program. (2005).
30 Center for Building Performance and Diagnostics Program (2006). Carnegie Mellon University.

Public Buildings Service developed a groundbreaking workplace programming process called WorkPlace 20•20. WorkPlace 20•20 is a comprehensive, interactive process that provides workplace solutions that are true mission tools for improving the organization's performance. It aligns the workplace with an organization's mission, goals, and business strategies.

As an early programming tool, the WorkPlace 20•20 process starts well before, and goes well beyond, traditional space design. It establishes a strategic mission focus for the workplace, helping people think about how and why they work—not just where they work. It also challenges Federal agencies to begin a workplace redesign by embracing the underlying mission and goals of their organizations. This process creates unprecedented opportunities to create value by linking building investments with business and behavior. It also provides innovative change management strategies so space can become a catalyst for change.

WorkPlace 20•20 is currently being refined and applied to a series of pilot projects involving 13 Federal agencies and more than 4,500 Federal employees. Results and lessons learned will be incorporated into guidelines and contract documents for designing and constructing innovative workspaces.

GSA World-Class Workplace Initiative

GSA is also applying innovative workplace principles to develop its own office space. Established by executive order of the GSA Administrator, the GSA World-Class Workplace Initiative provides a more structured, user-focused, and strategic approach to planning and delivering effective workplaces. This program assists the agency in meeting one of its strategic goals; to "maintain a world-class workforce and a world-class workplace." It is the application of the Integrated Workplace principles and WorkPlace 20•20 to a specific client, GSA.

All newly built GSA-occupied space is to be developed by first examining an organization's mission, business goals, and the occupant's nature of work, then using the findings to

determine the best work strategies and processes, space, furniture, and technology to support them. Improved workplaces that are more flexible and better "attuned" to each organization will help GSA offer the appropriate workspace tools. Features of these workspaces include:

- Flexible workspace that can be easily changed to meet changing needs.
- Healthy, comfortable workspace with fewer pollutants and more user adaptability.
- Sustainable work environments that use materials and processes in harmony with the Earth's ecosystems.
- Alternative work strategies, such as telework and hoteling, that can improve quality of life, decrease commuting and pollution, and reduce real estate costs.

The new GSA World Class Workplace will integrate people, process, and place to create healthy, flexible environments that enhance user satisfaction and performance, help attract and retain valued employees, improve organizational performance, and maximize resources.

5.2.2 GSA Workplace Strategies

Telework and Alternative Officing

GSA, in partnership with the Office of Personnel Management (OPM), has led the U.S. government in developing telework programs and guidance for all Federal agencies. An important workplace strategy, teleworking—also known as telecommuting or "flexiplace"—is a practical solution to environmental issues and quality of life challenges, especially work-life challenges. Combining telework with shared workstations also creates opportunities to reduce the amount of office space needed as well as real estate expenses.

The GSA/OPM partnership serves as the nexus for policy development, outreach, and collaborative partnerships to further the advancement of telework throughout the Federal Government, including developing policy concerning the alternative workplace;

promoting telework to and networking with Federal, private, and other customers; and offering technical support, consultation, research, and development. For more information on teleworking, refer to the articles in the Appendices.

Virtual Workplace

The virtual workplace strategy does not require employees to come into the office on a daily basis. Rather, they can work from home, a satellite center, a customer site, or even on the road. In the virtual workplace, work is *what you do—not a place you go to*. This strategy is firmly rooted in technology, which has provided the means for people to work anywhere, anytime; however, core business processes remain the same no matter where one works.[31]

The growth of the virtual workplace in the Federal Government can be attributed to a number of factors:

- The emphasis on e-government.
- The proliferation of new technologies that allow for more collaborative and distributed ways of working.
- A need to recruit and retain a "world-class" workforce.
- Mandates to allow more telework.
- A long-overlooked focus on continuity of operations.

This strategy supports moving work to where the employees are, rather than moving the employees to where the work is. The virtual workplace offers organizations an opportunity to reduce costs, increase productivity, attract and retain employees, and lessen environmental pressures.

Sustainable Development

The heavy toll that building construction and operation is taking on the environment has resulted in the sustainable, or "green," design movement. GSA is one of the leading Federal agencies helping to reduce the impact of buildings on the environment.

A powerful concept for creating "world-class" workplaces, sustainable workplaces also provide the effective work strategies and environments to accommodate individual work processes as well as organizational goals at the lowest life cycle "true" cost. When sustainable workplace concepts inform an organization's decisions, it will likely make the right decisions—those that benefit the project constituents, the environment, and the bottom line—enabling business success.

5.2.3 GSA Workplace Tools

Performance Measures

In 1998, GSA convened an interagency project team to develop standard real property performance measures as an effective benchmarking tool. The team concluded that measuring governmentwide real property activity and statistics is vital to assessing real property performance. Each year, OGP's Office of Real Property Management publishes *Real Property Performance Results*, an analysis of nine real property performance indicators in the Federal and private sectors. The indicators measure cost per square foot (owned and leased), vacancy rate, cost per person, customer satisfaction, employees housed, total square feet, number of Federal teleworkers, and sustainability. In 2005, the Performance Measures group also published a special edition on benchmarking monumental buildings.

GSA Cost per Person Model

This Excel-based model helps agencies calculate one of the seven original performance indicators developed by OGP, and continues to be a useful industry benchmark. It can be used to determine the average cost per occupant for space use, telecommunications, information technology, and alternative work environments. An additional feature is a "what-if" tool that calculates potential cost savings that can be realized from such alternative work strategies as telework and hoteling.

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31 Virtual Workplace information adapted from GSA's Office of Governmentwide Policy publication *Innovative Workplace Strategies* (2003b).

5.2.4 GSA Workplace Publications

The publications resulting from GSA's workplace research include:

- *Office Space Use Review: Current Practices and Emerging Trends (1997)* encouraged Federal agencies to go beyond traditional thinking about office space and view the space as more than simply a "box" for housing employees. The document also advocates that Federal strategic plans should focus on mission, but not overlook administrative costs such as real property.

- *The Integrated Workplace: A Comprehensive Approach to Developing Workspace (1999)* set the stage for new office space development methods based on strategic business approaches. This report advocated a multidisciplinary design approach for high-performance, adaptable workplaces and promoted leading-edge workplace concepts—such as the importance of flexibility in accommodating changing occupant and organizational needs—for achieving more effective office environments.

- *People and the Workplace (2001)* examined alternative work environments, and *Productivity and the Workplace (2001)* looked at the changing focus of real property performance measures, broadening the view of the workplace even further.

- *Child Care Design Guide (2002)* provided criteria for planning and designing child care centers in GSA-controlled spaces.

- *Innovative Workplace Strategies (2003)* presented two of the newest techniques and approaches Federal agencies can use to create innovative workplaces: "The Virtual Workplace" and "The Sustainable Workplace."

- *Collaborative Knowledge and Work Environments (2004)* discussed the issues and constraints about creating work places that support collaboration.

- *The Strategic Workplace: Development and Evaluation (2005)* showcased methods for linking the workplace to organizational effectiveness, and describes methods to measure how well the results work in practice.

- *Leading By Example: A Demonstration Toolkit for Creating a GSA World Class Workplace (2005)* offered process guidance to develop GSA workplaces that support individual work styles and strategic organizational goals.

Section 6: Case Studies

This section presents 14 "real life" case studies from diverse public and private sector organizations. The variety of examples illustrates that innovative workplace features can be applied across different facilities and organizations. Table 2 summarizes the case studies in this section, highlighting the primary benefits realized or anticipated by the organization.

Table 2. Summary of Case Studies

Case Study Number	Project	Primary Benefits
6.1	PBS WorkPlace 20•20 Pilot (Chicago, Illinois), 2005	Improved financial performance and business processes.
6.2	GSA Regional Office (Kansas City, Kansas), 2004	Decreased churn costs, enhanced communication and information sharing.
6.3	GSA Federal Supply Service (Fort Worth, Texas), 2004	Improved financial performance, information sharing, and image.
6.4	U.S. Patent and Trademark Office (Alexandria, Virginia.), 2003	Reduced office costs and improved employee productivity via telework programs.
6.5	Treasury Inspector General for Tax Administration (Washington, D.C.), 2003	Improved work-life balance and employee productivity through telework.
6.6	GSA Office of Real Property IW Pilot (Washington, D.C.), 2002	Improved collaboration and customer services.
6.7	GSA Mid-Atlantic Region (Philadelphia, Pennsylvania), 2002	Reduced space needs and increased staff interaction.
6.8	Deutsche Bank (Global locations), 2002	Improved space utilization, retention, and flexibility.
6.9	Millennium Pharmaceuticals (Cambridge, Massachusetts), 2002	Improved collaboration and space flexibility.
6.10	CIGNA (Philadelphia, Pennsylvania), 2002	Improved employee productivity and reduced turnover costs.
6.11	University of Miami (Coral Gables, Florida), 1995-2002	Enhanced productivity and customer satisfaction.
6.12	Herman Miller (Zeeland, Michigan), 2001	Sustainability, cost savings, and increased collaboration and communication.
6.13	GSA Office of the Future (Auburn, Washington), 2000	Increased collaboration and communication.
6.14	GSA Adaptable Workplace Lab (Washington, D.C.), 1999	Reduced operating expenses and churn costs, improved flexibility.

6.1 Case Study #1:

PBS WorkPlace 20•20 Pilot
(Chicago, Illinois), 2005

The GSA Public Buildings Service (PBS) occupants wanted to improve a 90,000-square foot space housing more than 400 people in a historic, yet modern, building designed by architect Mies van der Rohe. The occupants wanted to improve the workplace by facilitating more collaborative work and using technology to enhance mobile use of space. The agency also wanted to reapportion the space use, reducing individual workstations and creating better shared space.

A more democratic model for space allocation was necessary to create dispersed

Existing

Proposed

settings for teamwork. The use of wireless technology enabled staff to work anywhere, which became especially useful when creating the centralized filing area.

Challenges

- Improve internal processes.
- Support team effectiveness.
- Increase collaborative work and knowledge sharing.
- Improve financial performance.

Solutions

- Created dispersed team settings and eliminated visual and physical barriers between teams.
- Implemented wireless infrastructure to support distributed work.
- Provided a centralized filing area.
- Shifted to a more democratic model for space allocation.

Anticipated Results

- Reduced overall workplace square footage.
- Enhanced communication and information sharing through open circulation paths, team-oriented spatial configurations, and re-distribution of space to support impromptu meetings and collaboration.
- Improved access to information and files.
- Reinforced organizational values through the workplace.
- Improved financial performance by streamlining space standards and reducing total square footage.

6.2 Case Study #2:

GSA Regional Office Work Place 20•20 Pilot (Kansas City, Kansas), 2004

The Bannister Federal Complex was converted from a warehouse to office space, and the project area was a square-shaped space on the interior, with no windows. BNIM, the project architects, brought natural light into the space through a glass-enclosed atrium at the main entrance. Additionally, the architects installed skylights where roof vents existed, to open up exterior light and views to as many workplaces as possible.

Research findings were used to inform design implications for the new space. For example, BNIM had to balance facilitating shared space for teamwork with groups, such as payroll, that required private space and confidentiality. Common spaces were provided for informal interaction and for the display of work and ideas.

Challenges
- Stale, dark, divided work environment.
- Lack of spaces to initiate or support collaborative work.
- Need to support knowledge-sharing among systems and payroll groups.

Solutions
- Developed informal and formal collaboration space, while reducing individual space.
- Provided visual access and daylighting through use of glass and skylights.
- Inserted demountable partitions and flexible furniture to accommodate flexibility and change.
- Kept all four corners of the floor plate clear and kept all enclosed rooms away from the perimeter.

Results
- Decreased churn costs.
- Improved space utilization.
- Enhanced communication and information sharing among systems and payroll.
- Increased employee satisfaction through an improved work environment.

6.3 Case Study #3:

Federal Supply Service WorkPlace 20•20 Pilot (Fort Worth, Texas), 2004

Federal Supply Service (FSS) workspaces for 253 employees were scattered throughout an old depot building, creating inconsistent space quality and poor internal brand recognition across the organization.

Originally started as a small pilot project for 40 people, management later realized the advantage of a high-performance work environment and expanded the scope to include all FSS employees in Fort Worth.

By co-locating work groups in the Federal building, FSS hoped to enhance communications and information sharing, as well as improve financial performance by eliminating redundant support functions and unneeded real estate.

Challenges

- Inconsistent internal brand image across multiple locations.
- Desire to improve customer service.
- Desire to reduce cycle times and eliminate redundancies.

Solutions

- Co-located workgroups.
- Designed a first-class workplace to communicate a consistent image to internal and external stakeholders.
- Provided teaming and collaborative space.
- Implemented mobile technology.

Results

- Improved customer perception and product expertise by using the workplace as a showcase for FSS products and vendors.
- Enhanced communication and information sharing.
- Improved financial performance by eliminating redundant support functions.

6.4 Case Study #4:

Patent and Trademark Office (Alexandria, Virginia), 2003

The Patent and Trademark Office (PTO) near Washington, D.C., implemented a teleworking pilot program to test methods for housing more employees and improving productivity. PTO converted single-person offices into shared office space and offered employees willing to occupy smaller workstations the opportunity to work at home ("telework") three days per week.

PTO hoped teleworking options would improve their employee's quality of life and reduce turnover of highly trained staff. The arrangement was popular and successful, and was offered to all the trademark attorneys. Currently, 40 percent of the attorneys work at home three days per week and share an office when in the building.

Challenges

- Increase workforce without increasing space.
- Reduce commuting times.
- Improve quality of life.
- Provide incentives for retaining good people.

Solutions

- Implemented effective telework and office sharing. PTO provides the equipment and technology to allow its trademark attorneys to work from home three days per week, in return for sharing their office space with another person.
- Provided home office support and flexible telework schedules.

Results

- Eliminated three floors of office space by implementing a telework strategy, saving $1.5 million per year in rent.
- Improved employee productivity by 10 percent.

6.5 Case Study #5:

Treasury Inspector General for Tax Administration Virtual Resource Solution Program (Washington, D.C.), 2003

The Treasury Inspector General for Tax Administration (TIGTA) wanted to create a cutting-edge organization that leverages technology and forward-looking management practices to access knowledge instantly, while providing a more productive, efficient, and flexible work environment for their employees.

TIGTA's Virtual Resource Solution (VRS) program allows eligible employees to work from anyplace, and at any time, while still meeting the business needs of the organization.

Challenges

- Maintain comparable connectivity and effective interactions.
- Provide optimal work environment anywhere.
- Improve work/life balance.

Solutions

- Implemented high speed data connections and help desk support.
- Developed formal agreements, and published work schedules and progress reporting.
- Conducted flexible trial period and training for VRS.
- Implemented evaluation intervals.

Results

- Reduced number of private offices.
- Increased productivity due to decreased interruptions.
- Improved control over workload and product quality.
- Enhanced work-life balance.

6.6 Case Study #6:

GSA Office of Real Property Integrated Workplace Pilot (Washington, D.C.), 2002

Located at GSA Headquarters in Washington, D.C., the Office of Real Property's Integrated Workplace pilot tested many innovative workplace concepts, including GSA's Hallmarks of the Productive Workplace. The staff, management, and design team were actively involved in developing the project goals and design requirements.

Challenges

- Involve all staff in determining project goals.
- Optimize existing space and building layout.
- Address staff requests for more privacy, less noise, more adaptability, and better environmental conditions.
- Encourage collaboration, remote work, and interaction between management and staff.
- Test Integrated Workplace (IW) concepts.
- Work within limited budget and restricted space modifications.

Solutions

- Encouraged staff input and engagement in workplace design through surveys, focus groups, and design workshops; allowed each person to select his/her own ergonomic chair.
- Developed project requirements from staff input and linked design solutions to address these issues.
- Created smaller five-person office suites that reclaimed inefficient circulation space while providing more staff collaboration areas and reducing unwanted occupant distractions.

- Installed freestanding, moveable furniture and partitions, and task lighting.
- Implemented a combination of telework and desk-sharing to reduce workstations.
- Provided call forwarding and touch-down workstations for remote workers.
- Improved air circulation by relocating window air conditioners and installing ceiling fans.
- Improved lighting quality and efficiency by cutting back dropped ceilings near windows to provide more daylight.
- Provided more collaboration space, including small meeting rooms, work tables in each office suite, and a community space with a kitchenette.
- Developed space use protocols through staff consensus.

Results

- Reduced construction cost per square foot by 25 percent.
- Achieved 3 percent lower cost per person than recommended government benchmark.
- Decreased space per person by 10-percent less than recommended government average, without decreasing workstation size.
- Reduced maintenance times with easily moveable furniture and panels.
- Reduced staff move times due to moveable storage units.
- Accomplished faster and easier reconfigurations.
- Improved staff collaboration.

6.7 Case Study #7:

GSA Mid-Atlantic Region WorkPlace 20•20 Pilot (Philadelphia, Pennsylvania), 2002

GSA's Mid-Atlantic Regional Office had to relocate to new space because its lease expired in the historic Wanamaker Building in Philadelphia. They leased 133,000 square feet of new space in the historic Strawbridge & Clothier building, using the relocation as an opportunity to improve its workspace and business functions. Notable in this project was the fact that GSA created an experimental space (consisting of 12,000 square feet) within the old building to test new workplace concepts, educate the staff about innovative workplace principals, inform the design of new space, and better integrate work functions and processes prior to moving to the new space.

Challenges

- Integrate work functions and processes across the organization.
- Involve entire organization in assessing and revising workplace strategies.
- Explore innovative workplace concepts.
- Derive project requirements from business processes.
- Link organizational strategy and work processes to design solutions.

Solutions

- Used workplace prototypes to examine the nature of work and work processes and inform final requirements and specifications.
- Implemented new workplace supports for diversified work settings.
- Centralized files to increase work performance, information quality, and access to needed data; and reduce litigation costs. A byproduct was reduced space needs.
- Opened sight lines between workstations by reducing enclosures.

Results

- Reduced space needs.
- Improved staff interaction and accessibility.
- Better customer solutions through cross-functional teaming.
- Reduced workstation storage needs by developing a centralized filing system.

6.8 Case Study #8:

Deutsche Bank
(Global locations), 2002

With approximately 67,000 employees, Deutsche Bank is one of the world's leading international financial service providers. Realizing that change is critical to business success, Deutsche Bank created "db Smart Office." db Smart Office provides an appropriate range of work settings for every person and work activity. It promotes multiple uses of spaces, valuing communication, flexibility, and privacy. Good for both the corporation and the employee, Deutsche Bank attempts to see results in three broad categories:

1. Flexibility: Move people, not hardware; create a variety of workplaces for a variety of work.

2. Optimization: Increase efficiency, speed of communication, problem-solving, and innovation.

3. Motivation: Create more egalitarian work environments, demonstrate employee value, support corporate values, promote teamwork and opportunities for interaction and knowledge sharing.

Challenges

- Lack of flexibility to easily move people without reconfiguring space and services.

- Need to improve space efficiency.

- Need to promote teamwork.

Solutions

- Enhanced technical infrastructure and created a centralized equipment location.

- Built a variety of workstations to suit work processes and tasks.

- Designed the work environment for work activities, rather than status.

- Allowed for multiple use of all workspaces via hoteling and free-address workstation assignment, where applicable.

Results

- Projected 10- to 30-percent reduction in space and occupancy.

- Project costs anticipated to be recouped in only 24 months.

- Increased employee productivity with improved technology in the workplace.

- Ability to add employees without additional real estate expenses.

6.9 Case Study #9:

Millennium Pharmaceuticals (Cambridge, Massachusetts), 2002

Millennium Pharmaceuticals, founded in 1993 in Cambridge, Massachusetts, strives to develop breakthrough therapeutic treatments. Its newest research building, located in University Park at MIT, houses both lab space and offices. Lab space consists of 80,000 square feet of the 220,000-square foot building, which has a 75 percent useable to rentable space efficiency level.

Millennium wanted to provide maximum flexibility for future lab conversions, achieve the maximum density of chemistry uses allowable, and encourage planned and unplanned interactions between scientists. Additionally, the company aimed to accommodate high-hazard research in a safe and appealing structure. The developer-driven design features built-in flexibility, "see and be seen" floor plans, and an elegant interior and exterior. Paul Pratt, senior capital projects manager, states, "We designed this space to attract world-class talent in a way that would enable—never constrain—science."
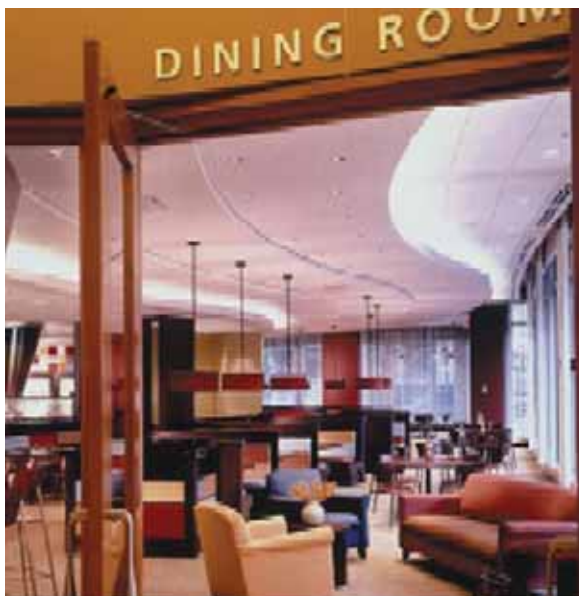
Challenges

- Provide maximum flexibility for future lab conversions.
- Encourage planned and unplanned interactions between scientists.
- Maximize open space and create a fun environment to draw occupants from other buildings to the campus hub.

Solutions

- Created interactive spaces to foster collaboration.
- Designed space for a kitchen and game room.
- Installed ductwork that allows for "plug and play" installation of fume hoods.
- Built "huddle space" in lab interior, including a PC, table and white board, and each level features modular fixtures with adjustable shelving.

Results

- Won *R&D Magazine's* 2003 Laboratory of the Year award.
- Improved collaboration and space flexibility.
- Demonstrated that a biology lab can easily be converted to a chemistry lab.
- Received positive feedback on openness and flow of space.
- Allowed for a good exit strategy for the developer/owner via flexible design.

6.10 Case Study #10:

CIGNA
(Philadelphia, Pennsylvania), 2002

CIGNA Corporation, a Philadelphia-based employee benefits firm, leases approximately 450 properties nationwide, with more than 44,000 employees. CIGNA implemented E*Work, a strategy aimed at allowing employees to work from anywhere at any time.

One of the biggest challenges to implementing E*Work was the corporate mindset at the middle management level. To successfully implement E*Work, the team partnered with the company's operating divisions, including both the human resources (HR) and information technology (IT) departments, to establish clear procedures.

The company leveraged technology-driven strategies to supply workers with cutting-edge technology, safety, and security. Because security was a major concern with the new technologies, CIGNA used a combination of Virtual Private Network (VPN), firewall software, and single-port routers to securely meet its connectivity needs.

In addition to streamlining efficiency, the technology-based initiative created a more satisfied and productive workforce.

Challenges

- Increase productivity by enabling people to work more efficiently.
- Support mission to attract and retain talented workforce.
- Middle-management mindsets and security concerns.

Solutions

- Leveraged technology-driven strategies.
- Established clear procedures.
- Supplied workers with technology, safety, and security.
- Partnered with HR and IT.

Results

- Improved employee productivity by 6 to 15 percent.
- Reduced turnover costs by $8 million.
- Enrolled more than 3,000 employees in E*Work program the first year.
- Won 2002 CoreNet Global Innovator's Award.

6.11 Case Study #11:

University of Miami
(Coral Gables, Florida), 1995-2002

The University of Miami in Coral Gables, Florida, wanted to address low productivity in its Office of the Physical Plant and reduce expenses by identifying energy-saving opportunities.

The university team conducted a labor study to determine the reasons for low worker productivity. The study revealed that employees worked only 30 percent of the time, and that only 26 of the university's 85 mechanics were working at any given time.

To improve these results, a team of workers and supervisors collaborated to develop methods for improving work processes. By implementing monthly performance indicators and other improvements, productivity and customer satisfaction increased significantly.

Challenges

- Low worker productivity.
- High energy consumption.

Solutions

- Conducted labor study to identify cause of problem.
- Created monthly performance indicators.
- Implemented supervisory training programs.
- Developed aggressive, but friendly, methods to make employees accountable for days off (requiring explanations for why they missed work).
- Replaced old, inefficient mechanical equipment and upgraded the utility plant.
- Overhauled work orders to enable more accurate information, resulting in employees taking the correct materials to job sites and being fully informed of the customer's requirements.

Benefits

- Increased productivity by 109 percent in two years – from 30 to 65 percent.
- Achieved 98 percent customer satisfaction rating.
- Reduced service response times by 80 percent.
- Reduced vehicle fleet by 16 trucks.
- Decreased the amount of worker's sick time taken by 44 percent over four years.
- Increased preventative maintenance completion rate from 40 to 90 percent.

6.12 Case Study #12:

Herman Miller Marketplace
(Zeeland, Michigan), 2001

Herman Miller, a furniture company that has been influential in workplace redesign and open-plan office space, wanted to consolidate its marketing operations quickly and on a limited budget. The company also wanted to create a more user-focused, sustainable design that was environmentally sound.

Challenges

- Consolidate marketing operations in a short timeframe, on a limited budget.
- Create a more user-focused design based on the nature of the organization's work.
- Attain a minimum U.S. Green Building Council LEED rating of silver.

Solutions

- Implemented an integrated, sustainable design approach focused on business needs and environmental sustainability.
- Developed unassigned touchdown workstations.
- Designed open floor plans and shared spaces for chance meetings and flexible meeting spaces.
- Implemented occupant-controlled lighting and temperature.
- Designed large exterior windows and high ceilings to achieve more controlled daylight.

Results

- Achieved LEED Gold certification.
- Increased work group process quality by 3 percent.
- Decreased project cycle times.
- Increased collaboration and communication.
- Improved employee morale, reduced space utilization, and reduced emissions through touchdown workstations.

6.13 Case Study #13:

GSA Office of the Future (Auburn, Washington), 2000

The GSA Northwest/Arctic Region's "Office of the Future" in Auburn, Washington, is a "living laboratory" that aims to change Federal work styles and attitudes. A social and design experiment, the laboratory provides an interactive, spontaneous, and innovative new vision of government work.

This is a unique office within GSA, for it was originally the only open office space that is occupied solely by a leadership group.

Challenges

- Low levels of communication across GSA business units—Public Buildings Service, Federal Supply Service, and Federal Technology Service.[32]
- Lack of accessibility to the senior leaders.
- Inability of the workplace to support work processes.

Solutions

- Conducted intensive, integrated space planning process involving an analysis of work processes, work culture, and functional requirements.
- Involved leadership in concept development and space design.
- Co-located senior leaders in open workstations to encourage better communication and interaction.
- Eliminated private offices with closed doors.
- Provided a variety of meeting areas to facilitate small and large meetings as well as individual privacy. These areas are shared among all the business units.
- Conducted a post-occupancy assessment of the workplace.

Results

- Increased communication and collaboration within business units.
- Motivated employees to improve work styles and attitudes.

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32 The former Federal Supply Service (FSS) and Federal Technology Service (FTS) are planned to merge to create the new Federal Acquisition Service (FAS).

6.14 Case Study #14:

GSA Adaptable Workplace Lab (Washington, D.C.), 1999

Completed in October 1999, the Adaptable Workplace Lab (AWL) is an 11,000-square foot, flexible, open-office environment located in GSA's Headquarters building in Washington, D.C. Similar to the new Roger L. Prager Intelligent Workplace facility developed by Carnegie Mellon University, the AWL was created to test the feasibility of developing high-performance office space in an existing historic building.

In addition to responding to the Federal mandate to provide sustainable environments, the design team wanted to show that healthy, flexible, modern office space can work for older, Federal historic buildings. It was designed to test the impact of flexible office technologies and products on organizational performance. The GSA team was committed to studying different solutions in a laboratory setting, which resulted in creating three "neighborhoods."

Challenges

- High churn costs due to organizational and technological change.
- Need to address new Federal mandates for sustainable design.
- Occupant complaints about poor indoor air quality and general discomfort in the workplace.

Solutions

- Designed individual, open-plan workstations divided into three "neighborhoods."
- Created a flexible infrastructure with modular furnishings to accommodate workplace changes. The modular equipment can be configured for private work areas or for a more open, contiguous work environment in one neighborhood.
- Introduced sustainable elements: with ventilation and conditioning systems separated, and a lighting system with daylight and occupancy sensors.
- Developed centrally located meeting spaces using a variety of adjustable solutions.
- Created kitchen/community space with all shared facilities.

Results

- Reduced churn costs by 90 percent, with one of the three furniture solutions.
- Reduced operating expenses for lighting, heating, and cooling.
- Improved individual temperature and ventilation control; and indoor air quality.
- Improved ability to reconfigure workstations in as little as 90 minutes.
- Reduced waste when reconfiguring spaces by using modular wiring and wall panels.
- Improved staff interaction.

Conclusion

Changes in modern business practices have altered the way people work inside and outside the office—and have also modified the office itself. To accommodate these and many other business changes, forward-thinking organizations have recognized the significant impact that positive innovative workplace strategies can have on employee and business performance, ultimately resulting in long-term cost savings.

Through extensive workplace research and pilot studies conducted over the past eight years, GSA has also come to realize the financial and productivity-based benefits of innovative workplaces. GSA advocates for all Federal agencies to move toward a more integrated and sustainable workplace model, in an effort to reduce operating costs and improve employee productivity and morale. In addition to providing the tools and best-practices discussed in the previous sections, GSA encourages agencies to adopt innovative workplace strategies by following these guidelines:

- Rethink standard practices by using sustainable, integrated design processes and services that support healthier and more productive workplaces.

- Develop new ways of thinking that go beyond function and aesthetics, considering how the organization's mission, strategic plan, and nature of work relate to its work strategies and space—creating work "places," not just work "spaces."

- Be an advocate for change by raising awareness of the strategic value of the workplace, educating customers or stakeholders and helping them use their workplace as a tool for change.

- Offer expanded services, such as organizational development, change management, and performance measurement to increase the scope and value of design processes and workplace solutions. Be prepared to demonstrate the value and impact of these services on the workplace.

- Share information with the real estate community on project progress or lessons learned.

This document demonstrates how progressive organizations are leveraging significant investments in workplace development to derive long-term benefits, and to achieve organizational mission and business objectives.

While individual impacts are a fraction of the whole, the cumulative impacts of incremental change, and compound effects of adopting integrated workplace planning principles are significant. If every Federal agency adopted innovative workplace strategies for all types of Federal space, the *potential* financial impact could reach as much as $39 billion annually, and the human impact—the improved health and satisfaction of each Federal employee—would be incalculable.
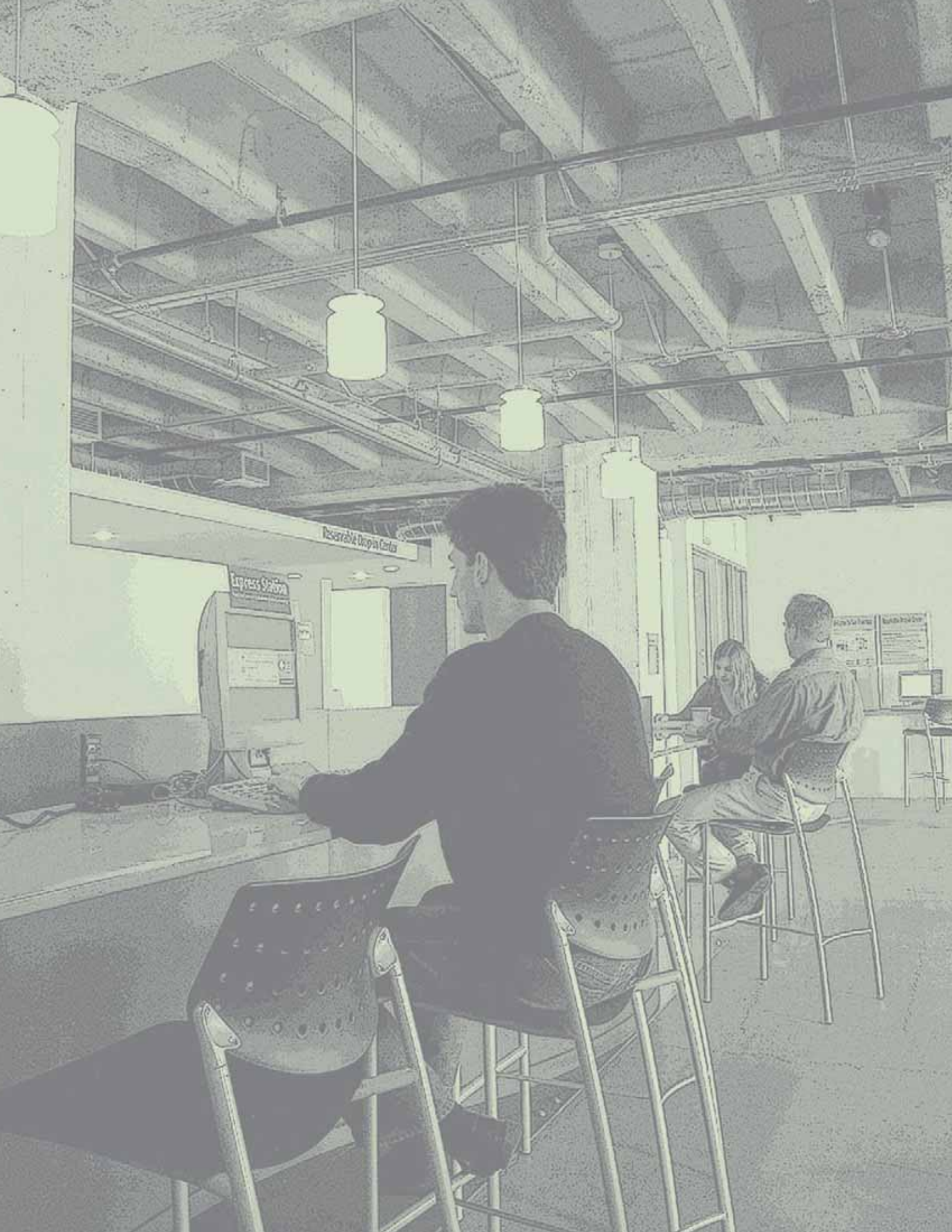
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World-Class Workplace
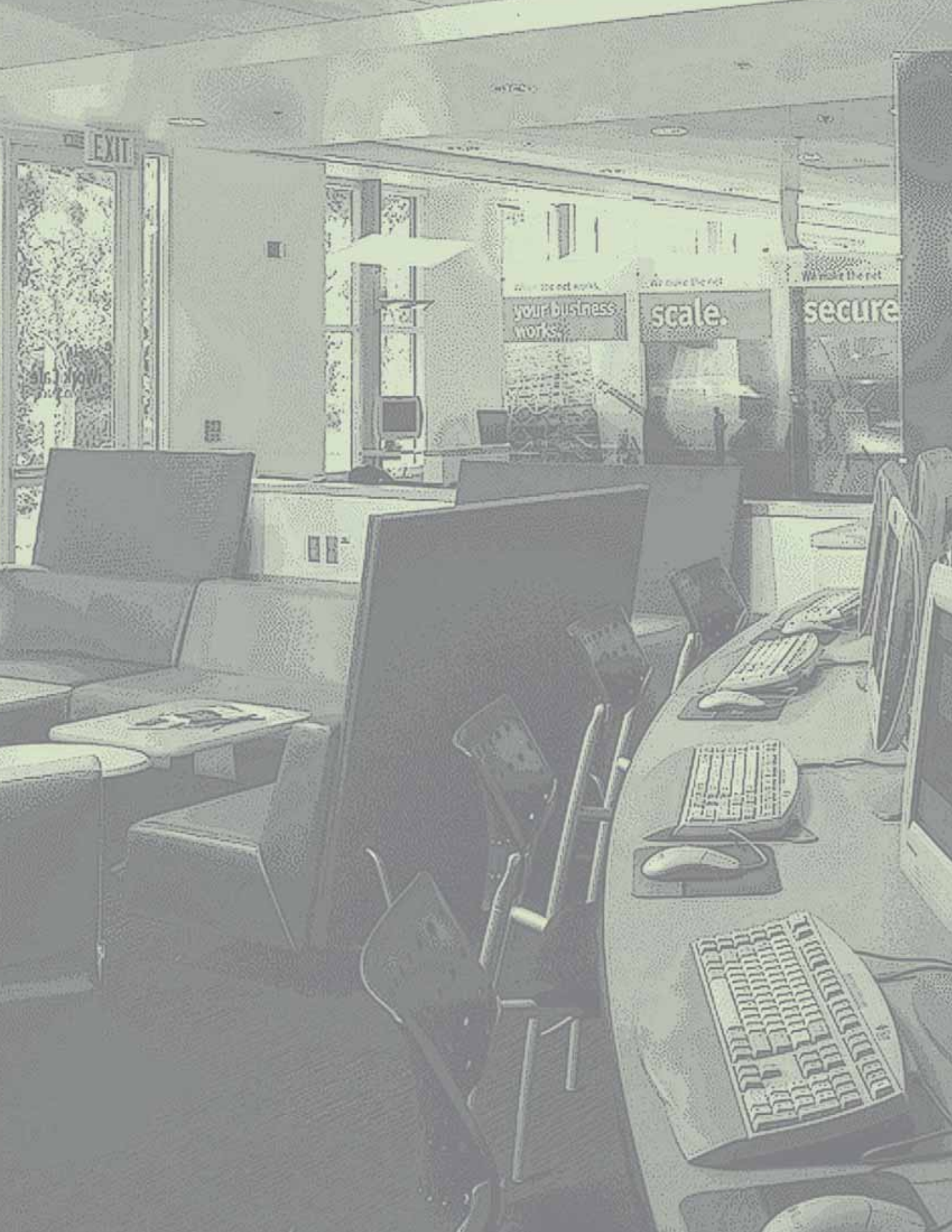
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Appendices

Appendix A:

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Appendix B:

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Appendix C:

Integrated Workplace Attributes

By Rob Obenreder and Michael Atkinson, January 2005. Revised January 2006.

General Considerations

Integrated workplaces go beyond function and aesthetics to become strategic business tools. They are the result of integrated, sustainable approaches to developing high-performance workplaces that reflect the GSA "Hallmarks of the Productive Workplace" described below. This approach involves the following design and management processes:

1. Develop written project goals based on business strategies with broad constituency involvement.

2. Make design decisions with occupant involvement based on health and comfort, project goals, occupant tasks, and adaptability to maximize workplace effectiveness for the users.

3. Use a project team with the requisite expertise, sustained involvement, and interaction throughout the project. In addition to design and construction experience, the project team should have specialized expertise in integrated systems design, lighting design, organizational development, change management, and communications.

4. If transitions between project phases involve new teams, provide continuity between phases by involving team members from the previous phase.

5. Use an integrated systems approach to analyze all building systems from a holistic model that considers impacts of each component on all the others and maximizes design and operational efficiencies. (See the ABSIC Guidelines for High Performance Workspaces at http://www.arc.cmu.edu/cbpd/projects/index.html.)

6. Base decisions on a life cycle cost analysis that considers both facility costs and staff costs over 10-30 years.

7. Use the most environmentally sustainable ("green") materials and construction and maintenance methods to eliminate or minimize any risk to those manufacturing and using the products.

Workplace Attributes

Integrated, high-performance workplaces should reflect the GSA "Hallmarks of the Productive Workplace" (shown in bold type below) and satisfy the recommended criteria listed below. Properly integrated, these attributes will result in work settings that can be changed to meet any organizational need with the least impact on future budgets or disruption to the users.

Equitable (or Spatial Equity): Design the workplace to meet the functional needs of the users by accommodating the tasks to be undertaken without compromising individual access to privacy, daylight, outside views, and aesthetics. Specific recommendations include:

1. Space standards should be based on documented work tasks, desired business processes, and other organizational needs.

2. All regularly occupied office space should have access to natural daylight.

3. Enclosed spaces such as private offices and meeting rooms should not block daylight and views from within open-plan offices.

4. Provide speech and visual privacy that matches work needs and organizational culture, especially for those seated in open-plan office workstations.

5. In open-plan office areas, accommodate needs for temporary individual privacy.

6. Provide a variety of adequate, alterable settings (furnishings, equipment, and software) to support changing needs and a high level of job performance and satisfaction, and accessible by all users.

Sustainable (or Healthfulness): Create workplaces using environmentally sustainable ("green") products and processes that provide a clean, healthy workplace environment, free of harmful contaminants and excessive noise, with access to quality air, light, and water. Specific recommendations include:

1. Provide clean, fresh air to each occupant's seated and standing breathing zone. Maintain air quality levels that provide an optimal working environment. These levels may be above minimum ASHRAE standards, such as those required by EPA for their own workplaces.

2. Provide exhaust ventilation per applicable codes and standards for all noxious fumes and odors, including those from copy areas, food preparation or storage, toilet rooms, janitor closets, battery/rectifier/UPS rooms, and diesel generator rooms.

3. Do not locate fresh air intakes where they can be contaminated by any noxious or lethal sources.

4. Prior to occupancy, and periodically after occupancy, monitor indoor air quality in occupied spaces to verify conditions meet requirements. This should include monitoring levels of contaminants such as carbon dioxide, carbon monoxide, radon, formaldehyde, and, if present, asbestos. Make any corrections necessary to eliminate hazards.

5. Give preference to office space with operable exterior windows.

6. Use only construction materials and methods that will not contain or release harmful contaminants that could adversely affect indoor air quality or require special treatment (such as abatement) during future modifications.

7. Do not contaminate occupied space or building systems during construction. Avoid contamination of in-place systems by not operating building HVAC systems in construction areas.

8. Perform routine building maintenance with trained mechanics to maintain specified air quality standards.

9. Use only maintenance and cleaning materials and methods that will not introduce harmful contaminates that can adversely affect indoor air quality and the health of service personnel and occupants. Assure training has been provided to all maintenance personnel in the proper use of maintenance equipment and products.

10. Commission all building systems to assure they meet design specifications. Performance levels shall be certified in writing by a licensed engineer.

11. Office layouts should provide all occupants with seated views to the exterior.

12. Use "green lease" provisions for leased facilities that meet or exceed GSA, EPA, and Pennsylvania Department of Environmental Protection guidelines. Building and interiors should be capable of LEED Silver certification.

13. Provide ergonomically sound furnishings and equipment, especially, but not limited to, task chairs, variable-height work surfaces, computer monitor stands, adjustable keyboard trays, and adjustable, moveable task lights.

14. Provide ergonomic consultation and training on office equipment use for all new occupants.

15. Optimize natural light penetration into office areas by using, to the extent possible, light transmitting vertical surfaces, especially where they occur parallel to windows.

Flexible: Choose workplace configuration components that can be easily adapted to organizational or work process changes, and can be readily restructured to accommodate key functional changes with a minimum of time, effort, and waste. Specific recommendations include:

1. Select workstation and office elements that facilitate user adjustment and reconfiguration, including furniture, task lighting, power, data and communications connections, and air supply control.

2. Provide free-standing, modular furniture components for all individual offices and workstations. Work surfaces should be small and light enough to be moved by one person. Heavy furniture such as file cabinets, storage towers, and book cases should be on wheels, glides, or other devices so that, when fully loaded, they can be moved by one person.

3. Provide power, data, and communications services through plug-and-play and/or wireless systems, with integrated cable management to the desktop that allows connections to be made easily, by the occupant, to serve components anywhere within the workstation.

4. Provide flexible utility distribution systems that can service any location or accommodate common space uses without requiring demolition and new construction of building or space elements.

5. For open-plan office workstations:

   a. Provide workstation enclosures with modular, freestanding elements, such as stackable panels or moveable screens that can be reconfigured with a minimum of time or special support. Minimize the number of different panel or component sizes and installation hardware. If possible, select a single, uniform panel size for optimal interchangeability.

   b Minimize the total "kit of parts" required to construct workstations without compromising function.

   c. Avoid panel-hung elements that cannot work with freestanding panels.

   d. Avoid running wiring within panels of workstation enclosures.

   e. Use modular clamp-on desk power and data terminals where desk-height utilities are needed. Feed from accessible, independent power sources in lieu of beltline raceways or other internal wiring systems.

   f. For open-plan, rectilinear "cubicles" where space is at a premium, consider freestanding, modular work surfaces that can be easily reconfigured by the occupant in a variety of arrangements and that have surfaces that nest together without major gaps between adjoining work surfaces. Avoid using free-form work surfaces that waste precious space when used in small, enclosed areas.

6. Provide room enclosure assemblies that meet the sound transmission requirements of applicable codes and standards, such as the GSA Facilities Standards for the Public Buildings Service. Where fully enclosed spaces are required, consider using modular, reusable panels that maintain applicable acoustic requirements for speech privacy.

7. Carefully consider needs for, and locations of, shared-use facilities such as meeting rooms, copy centers, file storage, and kitchenettes. Establish requirements that will satisfy the carefully defined needs of the users in the most effective way. Size spaces to fit requirements, and consider modular meeting space that can be quickly re-sized as needed. This may include "drop-in" flexible meeting spaces that serve small groups of 4 to 8 people; separated by operable walls that can be opened to create larger conference rooms when needed.

8. Provide for a central reservation system for all shared meeting facilities, especially for large buildings.

9. Offer and support alternative work strategies developed as an integral part of business operations, including:

   a. Encouraging the use of telework and enabling the maximum number of teleworkers and telework days for eligible tasks.

   b. Supporting alternative work strategies with responsive spaces such as touchdown workstations,

community centers, desk sharing, hoteling, collaborative space, and reverse telework centers.

c. Using shared workstation strategies (desk sharing, hoteling, etc) where work needs make it possible to achieve greater net space savings.

d. Providing the protocols, equipment, software, and services necessary to fully support remote work at the same level as on-site work.

10. Design workspace and communications/IT infrastructure to accommodate a fully networked, flexible organization; and, to maintain continuity of operations independent of any specific location.

Comfortable: Distribute workplace services, systems, and components that allow occupants to adjust thermal, lighting, acoustic, and furnishing systems to meet personal and group comfort levels. Specific recommendations include:

1. Provide individual user control, within a reasonable range, of temperature and ventilation conditions at each workstation.

2. Provide individual user control of lighting, including integrated lighting solutions that use daylight to the maximum extent possible.

3. Provide lighting designed for both quality and light levels per the latest editions of the "IESNA Lighting Handbook" and the "Advanced Lighting Guidelines" published by the Illuminating Engineering Society of North America.

4. Design lighting to illuminate surfaces rather than volumes.

5. Follow appropriate IESNA guidelines for lighting color temperature and color rendering.

6. Provide a level of visual privacy for open-plan workstations that generally satisfies work requirements, occupant demographics, and organizational need. (Note: Flexible furniture solutions should be readily adaptable to accommodate varying degrees of privacy.)

7. Provide furniture within the workstation enclosure that can be reconfigured by the user without tools or special expertise. Allow complete location flexibility for computer desk surfaces, storage elements, and computer monitor.

8. Select workspace elements that are modular and are equally adaptable for right-handed or left-handed configurations to accommodate user needs or building conflicts.

9. Furnish freestanding work surfaces with supports, such as "C" legs with low-profile bases, that minimize obstacles to user movement within the work area.

10. At a minimum, provide work surfaces that can be adjusted by simple means (such as pins in sliding leg tubes) to accommodate ergonomic height requirements. Except where required by special need, "one-touch" height adjustment mechanisms are not necessary.

11. Enable occupants to choose, to the extent possible within furniture standards and budget, ergonomic workstation elements that best support their work needs and style, especially such items as task chairs, keyboard trays, storage units, desk accessories, etc.

12. Create a variety of work settings with varied types of seating to suit identified work types, meeting types, and individual needs.

Connectable (or Technological Connectivity): Enable full communication and simultaneous data access among distributed co-workers for both on-site workplaces (including individual workstations, team space, conference/multimedia space, hoteling space, etc.) and off-site workplaces (including telework or commuting center, home office, travel venues, etc.). Specific recommendations include:

1. Provide a unified, enterprise-wide voice and data system that can meet the work process automation needs of all occupants and allows data sharing/access across the organization.

2. Establish a standardized baseline computer configuration for all users, with additional special elements added to the standard configuration as justified.

3. Provide a telephone service that can provide one phone number access for each person, regardless of location, and that links both desk and mobile handsets.

4. Provide robust network access and support for remote workers from any location.

5. Select data, voice, and software systems that can accommodate wider utilization of wireless equipment or devices and larger collaboration groups. Workspaces, hardware, and software should also anticipate/accommodate the introduction and implementation of video or "virtual presence" systems such as multi-media desktop conferencing.

6. Provide for current and future virtual meeting needs, including the capability for quality video conferencing in meeting rooms. Also consider video at the workstation, desktop and laptop.

7. Develop and maintain a healthy dialogue between leadership and staff that fosters clear expectations for both groups and generates "protocols" for working arrangements, especially for those working away from the office.

Reliable: Support the workplace with efficient, state-of-the-art heating, ventilating, air conditioning (HVAC), lighting, power, security, and telecommunication systems and equipment that require little maintenance, and are designed with back-up capabilities to insure minimal loss of service or downtime. Specific recommendations include:

1. Use a combination of ambient and task lighting systems, relying on task lighting to meet required illumination levels on work surfaces while keeping overall ambient lighting levels low. Use daylight to the maximum extent possible.

2. Provide ambient lighting through a combination of controlled daylight and indirect or direct/indirect dimmable, high-efficiency fluorescent fixtures,

individually addressable for occupant control, and automatically controlled by both occupancy and daylight sensors.

3. Provide task lighting through a combination of glare-free daylight and user-reconfigurable fixtures with high-efficiency lamps.

4. Provide HVAC systems with displacement ventilation and individual user control of temperature and air flow (within reasonable minimums and maximums). Select systems that can be easily adapted to changing space configurations and uses without involving demolition and renovation work that generates waste.

5. Provide training and written operating instructions to **all occupants** on use of building systems and features, office equipment, and software, including, but not limited to, personal comfort, building operation and facilities use, HVAC systems, computers, computer peripherals (printers, scanners, etc.), copiers, faxes, lighting, and furniture (especially with regard to ergonomics). Occupant user manuals should be provided electronically, limiting the printing of hard-copy documents to small summary cards, etc.

6. Provide building systems security and access control to adequately safeguard the physical health and safety of building occupants. As early as possible, link reliability of systems to a central command location, especially for health/life/safety considerations during emergency situations or when advance notice is possible.

7. Develop and implement a comprehensive maintenance program to keep all building systems and equipment in good operating condition and to minimize breakdowns.

Identifiable (or Sense of Place): Endow the workplace with a unique familiarity, character, image, and business identity that enable and convey a sense of pride, purpose, and dedication among both the individual and the workplace community. Specific

recommendations include:

1. Provide designs of the highest aesthetic quality and best value that successfully address organizational image or "branding."

2. Provide clean, attractive, accessible, functional spaces that occupants can take pride in showing to colleagues, family, and friends.

3. Provide amenities that are valuable to the building occupants and that enhance way-finding, image and identity.

   a. For public areas, consider seating, plants, security staging areas, integrated information display systems, exterior and interior signage, employee and room location guide, and exterior building name and address number.

   b. Consider occupant amenities such as food service, food vending, and break areas with kitchenettes, as well as facilities for exercise, child care, and elder care.

   c. When choosing a building location, consider pedestrian and public transit access, average commuting time, green space, views, and availability of neighboring services and amenities such as restaurants, shopping, dry cleaners, pharmacies, and repair shops).

4. Address transportation needs in an environmentally sustainable manner, making provision for all applicable transportation modes, with special focus on pedestrian and public transportation access, handicapped accessibility, and alternative transportation modes such as shuttle buses, carpools, and bicycles.

5. Provide opportunities for connection to nature through views, lighting, and material choices.

6. Employ skilled, friendly, helpful, building management staff committed to timely responsiveness to occupant needs with a minimum of disturbance or disruption.

7. Provide guidelines, controls, and supervision for building operations, maintenance, and alterations to avoid changes that detract from building and space quality so as to maintain or enhance original design qualities and aesthetics and maintain a cohesive workplace appearance.

8. Use color judiciously to create and reinforce desirable moods and themes. Avoid colors that will cause glare or reduce reflectivity near natural light sources.

9. Use real or virtual mock-ups to demonstrate proposed workplace components and get feedback from users on applicability and ease of use.

Appendix D:

Policy Development for Video Conferencing (Virtual Presence)

By Theresa Noll, GSA Office of Real Property

Background

In April 2004, the GSA Governmentwide Telework Team embarked on a Pilot Project, in partnership with the Telework Consortium, to test and study the potential for providing *virtual presence* (i.e., desktop video conferencing) to home-based teleworkers. The Telework Consortium is a non-profit organization established "to speed the early adoption of cost-effective, easy-to-use designs and technologies for working and collaborating from remote locations" (see http://www.teleworkconsortium.org).

Throughout the summer, the team worked through many of the technical issues surrounding the ability to conduct a desktop videoconference among their home-based offices. Success was achieved in late summer 2004 for desktop video conferencing between home-based teleworkers, the Telework Consortium, and the Winchester, Virginia Telework Center. Plans then began for expanding the Telework Pilot Project to the GSA Headquarters Central Office in Washington, DC, a more challenging endeavor.

In December 2004, a successful desktop videoconference was conducted between GSA Headquarters, the Telework Consortium, and the Winchester Telework Center. Currently, the GSA Telework Team is developing policy and procedures for the use of virtual presence as an enhanced form of communication for remote workers.

Benefits of Virtual Presence

Desktop video conferencing is a progressive method of communication in the increasingly mobile and distributed workforce. Communication via traditional email can sometimes lack subtle meanings that voice inflections can indicate. Voice communication over the telephone can lack the emphasis that body language contributes to the meaning of the message. Desktop video conferencing is closer to live, face-to-face communication between two or more people because you can incorporate body language and voice inflections. This leads to better communication and understanding, which can contribute to greater productivity. Video conferencing is used increasingly to reduce travel. Long distance communication around the globe is increasing. GSA, in its leadership role in telecommunication, serves as a model to other Federal Agencies. Pilot testing of desktop video conferencing helps GSA to effectively share the knowledge it gains with other agencies. Desktop video conferencing may help pave the way for managers in the Federal Government to embrace telework and meet the legislative objectives to provide telework opportunities to eligible employees.

Technology Considerations

As a Pilot Project partner, the Telework Consortium provided the collaboration software, video systems, hardware and network to support desktop video conferencing. Home-based offices require broadband (i.e., high-speed) communications capability to accommodate live video data transfer. Security is a major consideration for GSA Headquarters. Special server configurations were put in place to ensure the security of the GSA Central Office network. Due to the high bandwidth requirements

associated with conducting a desktop videoconference, network degradation in the GSA Central Office is another major area for analysis. Thus far, no negative performance impact on the network has been realized; however, testing of throughput and traffic will continue as additional desktops are added.

Policy and Procedures

The GSA Telework Team is developing policy and procedures to govern the use of desktop video conferencing for GSA. Security and bandwidth requirements dictate the judicious use of desktop video conferencing. Privacy considerations will be included in the policy, as well.

Conclusion

GSA plans to continue expansion of the virtual presence capability. Implementation in one program office within GSA Headquarters is underway to meet the specific requirements of that office. For additional information on virtual presence, please contact Theresa Noll at Theresa.Noll@gsa.gov.

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