Connected and Sustainable Work

Written specifically for
Connected Urban Development
Global Conference 2008—Amsterdam

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About Connected Urban Development

Connected Urban Development (CUD) is a public-private partnership program focused on innovative use of information and communications technology (ICT) to make knowledge, people, traffic, and energy flow more efficiently. This increased efficiency enhances how people experience urban life, streamlines the management of cities, and decreases the urban environmental footprint.

The program's main success elements are:

- Measuring CO2 emissions reduction resulting from operational implementation of CUD projects within cities.
- Demonstrating the positive impact of ICT and broadband connectivity on climate change
- Developing relevant thought leadership and replicable methodologies allowing CUD partner cities to learn from each other and share their experiences and best practices with cities around the world

The initial scope of the program includes five major areas of focus:

- Connected and Sustainable Work
- Connected and Sustainable Mobility
- Connected and Sustainable Energy
- Connected and Sustainable Buildings
- Connected and Sustainable ICT Infrastructure

Context

Connected Urban Development's approach is based on understanding the opportunities technology offers for enabling sustainable patterns and blueprints for human exchange and enterprise. Because of the impact of work on adoption of these patterns and, ultimately, on development of a model for a sustainable and livable city, CUD believes the opportunity to introduce innovation in work enablement using ICT is equally important to delivering solutions to problems for energy, transportation, housing, buildings, and society at large.

Traditional models of knowledge work included elements such as office space, co-location of teams, and time-based employee performance metrics. Today, these models fail to fully realize technology's potential for increasing productivity, minimizing the impact of travel on the environment, and reducing inefficient use of space and energy in offices, as well as for addressing the long-term impact of stress on workers' health and productivity.

Major factors such as climate change, evolution of the global talent pool, and technology are increasingly becoming catalysts for change, offering the opportunity for people to work in new and more sustainable ways. We are also experiencing dramatic changes in the way people choose to work.

Now, more than ever before, knowledge workers are opting for more collaborative and flexible forms of work that allow them to contribute when they want, from virtually anywhere, and with almost anyone. At the same time, the speed demands and complexity of knowledge work have increased significantly, driving the need to collaborate and engage a broader workgroup to obtain needed results. The convergence of these factors is spawing new paradigms for how work gets done, along with great opportunities to innovate.

This paper introduces the vision of Connected and Sustainable Work. In the pages that follow, we will explore factors driving the evolution of knowledge work, the principles of sustainable work, and solutions that incorporate these principles. The main objective is to provide cities, employers, and citizens with a new framework for fostering economic growth, increasing the quality of life in cities, and addressing the challenges of climate change.

The Case for New Models of Work

While we view the potential implications of ICT solutions as relevant to all areas of work, this paper focuses on the needs of the *knowledge worker*.[1] Knowledge workers deliver information rather than goods, and are now estimated to outnumber all other workers in North America by at least a four-to-one margin.[2] In 2006, 77 million people in the European Union (EU) 27—35.9 percent of the total workforce—were employed as knowledge workers.[3] IDC estimates that the growth rate of knowledge workers worldwide doubled that of other occupations between 1999 and 2007.[4] Information workers accounted for 72 percent of the U.S. labor force in 2005, and by 2009, IDC estimates that 121 million Americans (out of a total working-age labor force of 160 million) will be employed as knowledge workers.

The nature of the work performed by knowledge workers offers huge opportunities for innovation in how, when, and where they work. Some of the most relevant aspects of knowledge work include the following:

- **Knowledge work is based on specialized knowledge and the ability to access and use information.** Every work product is different, and repetitive operations are minimal. The worker's "raw material" is information and knowlege, which can be harvested from many sources, including peers or experts, as well as from virtual or physical media. The knowledge worker is productive as long as this information is available and accessible.

1. A knowledge worker is one who works primarily with information or who develops and uses knowledge in the workplace. Peter Drucker, 1959.
2. Haag et al, 2006, page 4.
3. epp.eurostat.ec.europa.eu/.../PGE_CAT_PREREL_YEAR_2008_MONTH_03/9-10032008-EN-BP.PDF
4. "The New World of Work: Evolution of the Work Force," Microsoft, October 2005; http://www.ebizq.net/blogs/it_directions/archives/2008/07/is_your_company.php

- **Higher degree of flexibility.** Because the work is highly results-oriented, the worker has far more flexibility regarding "when" or "where" the work gets done. More than half of all knowledge workers in Europe—a higher proportion than non-knowledge workers—say they can adapt their working hours.[5]
- **The process of work generation is highly invisible.** Whether it is knowledge creation, innovation, or problem solving, most knowledge work can't be seen while it's in progress. According to author and consultant Fred Nickols, "The working behaviors of the manual worker are public and those of the knowledge worker are private. From the perspective of a supervisor or industrial engineer, this means the visibility of working is high for a manual worker and low for a knowledge worker."[6]
- **Knowledge workers are motivated by qualitative results and autonomy.** Typically, knowledge workers drive for completion of tasks, not hours worked. In a survey of European knowledge workers, for example, respondents ranked solving problems, the feeling of doing useful work, and the satisfaction of "work well done" as the three most important factors contributing to "good work."[7] Furthermore, knowledge workers prefer autonomy to any other job characteristic.[8]
- **Knowledge work is highly collaborative.** The work is focused on using specialized knowledge and manipulating information for innovation, the generation of new knowledge, or value-added problem solving. Given the increases in both demand for speed and the complexity of problems in today's business environments, collaboration is no longer an option for knowledge workers.

The knowledge worker is mobile, less dependent on space and time, requires access to others to collaborate, and is highly autonomous. All of these attributes provide a rich platform for innovation. Knowledge workers also represent a significant portion of workers who commute and travel on business. In the United Kingdom alone, workers took 7 million business trips by air in 2005. A sizable majority of these flights were taken by staff traveling to headquarters or satellite offices of their own organizations.[9]

The environment for knowledge work during the 20th century was based on mobilizing an organization around a task or a function in a physical office. This office work was characterized by "assigned office space," the prevalence of hierarchical organizations and culture, work commitments mainly bound by time, and limited work interactions outside the group or enterprise. This model demonstrated high resistance to change and offered limited support for the needs of knowledge work.

In the 21st century, a few key elements are driving adoption of new and different knowledge-work models and work environments. Among the most significant are heightened complexity and demands for faster completion of work, technology, changes in the global talent pool, and awareness of sustainability and climate change.

5. "Exploiting Europe's Knowledge Potential," The Work Foundation, 2007.
6. Fred Nickols, 2003.
7. "Exploiting Europe's Knowledge Potential," The Work Foundation, 2007.
8. Cheney, 1984; Goldstein and Rockhart, 1984.
9. Management-Issues, August 2006.

Heightened complexity and demand for speed in the completion of knowledge work have driven significant changes in approaches to workforce efficiency and productivity. Isolated work environments limit innovation, deny the opportunity to use the wisdom of others, and significantly diminish time to market of an idea or product. Globalization enabled by technology has shifted the expectations of the marketplace in both the delivery and consumption of an idea or product. These expectations, accelerated by contrasts in the global talent pool, are making collaboration ***essential*** to knowledge work.

Technology is enabling new forms of work. Considerable developments in end-user applications, hardware, and the network itself—powered by continuously growing bandwidth and a more symmetric connectivity capacity—is transforming the way work is done. Among the most important elements enabled by technology are mobility, pervasive collaboration, and high-quality interactions.

Technology enables workers to access information, knowledge and information—and deliver high-quality results—while working from almost any location. In the United States, 40 percent of the workforce is considered "mobile" and 35 percent spend at least 20 percent of their time away from a primary workplace.[10] IDC expects the global mobile worker population to increase from more than 650 million in 2004 to more than 850 million in 2009, representing more than 25 percent of the worldwide workforce.[11]

Collaboration is critical to the success of the knowledge worker. Collaboration technologies allow workers to tap into a global well of experience and knowledge, and to deliver higher-quality results in less time. Secondly, with workgroups gathering physically or virtually, these technologies ensure that knowledge is retained for the collective as individuals participate from a remote location, engage virtually, or meet in a physical setting—and as contributors join or leave a workgroup.

A recent JBA survey of mobile workers cited "the need for face time" as the overwhelming reason for traveling.[12] Consequently, high quality and reliability of interaction tools such as conferencing, meetings, and voice communications are critical to enhancing the experience and quality of remote and distributed work. Recent innovations in video, voice, and access communications deliver this quality to the worker.

Technology enables a worker to be both connected and "magnified":

Connected implies the worker is attached to the work and workgroup, while detached from the physical workspace. Any place is a potential workplace, and the traditional definition of "work schedule" begins to change as the worker defines the workday with far more flexibility.

Magnified implies that the worker has *infinite* access to the knowledge, information, talent, and resources he or she needs within and outside the organization. This access redefines the workgroup and the talent pool—and multiplies the productivity of the worker—through enablement of pervasive collaboration.

10. Yankee Group.
11. Regus, 2007.
12. Management-Issues, August 2006.

The global talent pool is experiencing dramatic changes both in size and distribution of talent. Over the next two decades, Sub-Saharan Africa and South/Central Asia will see their labor forces increase by between 200 and 300 million, while those of North America are expected to increase by just 20 million. At the same time, the labor force in Europe/Russia is expected to shrink by almost 40 million.[13] For knowledge workers, this contrast results in a large gap in the workforce in certain areas if traditional work models are maintained. For example, in fields such as science and engineering, 78 percent of doctorate degrees granted worldwide in 2002 were outside the United States—about one-third in the EU and an equal number in Asia. This means that organizations must tap the global talent pool to meet their needs for innovation in these fields when local talent isn't enough. Along with these trends, the workforce is becoming more diverse, accentuated by new patterns of mobility and immigration, introducing a rich blend of cultures, generations, gender, and other dimensions into the workforce. This diversity is driving the need for new and more flexible work models such as the incorporation of social networks, open and diverse workspaces, flexible work agreements, and new models for employee engagement.

Impact of traditional work models on sustainability and climate change: Inefficient use of space due to traditional office models, congestion caused by "office hour" commute patterns, and the belief that hours worked equate to higher performance all add to the ongoing challenges that cities face when addressing the challenges of climate change. About 3.3 million Americans travel 50 miles or more each way to get to work, and they commute these distances 329 million times a year, according to a National Household Travel Survey.[14] In order to optimize use of energy, space, transportation infrastructure, and natural resources, a comprehensive strategy for sustainability must include the evolution of work. The rise in energy costs in recent months is causing a profound impact on economic growth in cities and in the lives of citizens. Shifting the patterns of work, enabled by ICT, offers valuable contributions to solve these challenges.

Connected and Sustainable Work: Vision and Principles

The *enablement* of work that optimizes the use of talent, delivers benefits across the broad stakeholder community (citizens, employers, governments), and respects the boundaries of the *ecosystems of support* (natural and human resources) is called "Connected and Sustainable Work."

Principles of Connected and Sustainable Work

Connected and Sustainable work is defined by a set of principles that define this new model of knowledge work:

1. The employee redefined

Connected and Sustainable Work expands the talent pool by redefining the workforce as a collection of "workers" instead of "employees." New forms of talent engagement

13. IBM, January 2008.
14. Bureau of Transportation Statistics.

include specialists, customers, the public, free agents, virtual workers, contractors, consultants, and traditional employees who participate in knowledge work through employment, co-innovation, collaboration, crowd-sourcing, wiki participation, and many other forms of work. This evolution involves a new culture and approach to talent, as well as the use of technology to access, recruit, and retain talent, and to build loyalty and trust among workgroup members.

2. The 21st century "office": work follows the worker

Work must reach the talent, wherever it may be. Confining work to a physical space limits that talent to local availability and depth of skills. In addition, the rigid framework hinders collaboration, co-creation, and knowledge-sharing benefits. In Connected and Sustainable Work, work follows the worker, wherever the worker may be. This work model enables ample physical and virtual collaboration options, integrating social, work, co-creation, and collaboration activities. The workspace is no longer exclusively "work" or "physical." In this redefined "office," new communities and group identities result. Working relationships and synergies are often initiated as social relationships that smoothly transition into working relationships and vice versa. As these ad-hoc work and collaboration units form, the talent pool expands to meet the needs of the task at hand.

3. Evolution of "going to work"

While a complete replacement of physical travel to work is not feasible or desirable, the redefined workspace begins to shift the patterns of transportation to and from work. In "connected work," workers no longer organize themselves around a fixed "commute hour" or plan their work schedule based on arrival at a physical office. As the concept of a work schedule becomes fluid, new forms of distributed work allow workers to contribute any time of the day, rendering traditional "office hours" obsolete. The exchange of information is no longer the driving reason for traveling to work. The implications of this new, fluid schedule bring significant gains in the efficiency of energy consumption in physical workspaces, and added productivity to the workgroup. According to the Work Design Collaborative of CoreNet Global, by 2010 in the United States, 40 percent of work will be done in corporate facilities, 40 percent at home, and 20 percent in "between" (hotels, convention centers, airports, public places, and so on).

4. The new workgroup: collaboration, self-regulation, and a new identity

Connected and Sustainable Work moves away from hierarchical/rigid organizational models to encourage creation of fluid, spontaneous, and self-regulating teams in which peers self-select, collaborate, engage, and assign value to each other's contributions as they innovate, complete a task, or solve a problem. This new engagement delivers flexibility to the worker and workgroups, and addresses demands for faster solutions to more complex problems. Now the identity of a workgroup becomes more independent of physical space, associated instead with the work and group interactions. For remote groups, identities are forged virtually, with web-based collaborative spaces providing continuity and the group culture and "identity" centered on the task at hand. The cubicle, the enclosed office, and the business-unit floor no longer create identity.

5. Connected and Sustainable Work spaces are user-centric

In a distributed Connected and Sustainable Work environment, "central" and "peripheral" workspaces are replaced by "connected" and "peer" workspaces. In a physical environment, no office is "satellite" or secondary, and every facility is a primary and equally relevant location or point of access for work, data flows, knowledge exchange, and services. In the virtual working environment, workspaces are allocated to meet the needs of workers and work itself, and not based on rank or hierarchy. Likewise, services offered in each workspace—physical or virtual—depend on the needs of users served.

6. Connected and Sustainable Work: new models of resource optimization

Connected and Sustainable Work offers the employer new, integrated, and flexible models of physical and virtual spaces that deliver the opportunity to reduce operational expenses. To workers, it delivers increased productivity by reducing commuting and travel time. It is estimated that telecommunicating can improve employee productivity anywhere from 20 to 70 percent.[15] This is because Connected and Sustainable Work models integrate flexibility with the benefits of physical and virtual infrastructures from their inception, as opposed to flexible options being incorporated as "add-ons" to the traditional, centralized infrastructure as an afterthought. For this integration to deliver optimization of resources such as space, energy, transportation, and worker productivity, it must incorporate three considerations:

- Workspaces must be close to workers, not vice versa.
- Work environments—virtual and physical—must be flexible and able to support multiple forms of work: individual, group, organized, and ad-hoc.
- Work spaces must deliver a combined suite of core and custom services tailored to the needs of workers served.

7. Connected and Sustainable Work: a new value proposition

At the core of Connected and Sustainable Work is redefinition of the value proposition to the worker. Some elements of this new value proposition include:

- New and open forms of rewards and compensation to recognize and encourage contributions enabled by the expanded definition of "worker."
- New forms of visibility for worker contributions that ensure autonomy, fairness, and trust.
- Diversity and flexibility take a new dimension of importance to the workforce and employer. Organizations must now assume a broader view of value to the worker that includes quality of life, linkage to the local community, flexibility, peer group, and trust. For instance, a 2005 survey conducted by the Information Technology Association found that 36 percent of respondents would choose telecommuting over a pay raise. This highlights how traditional salary-based rewards alone may not deliver expected incentives to workers.

15. Keith Ervin, 1998.

Rendering Telecommuting Obsolete

Telecommuting is defined as a "work arrangement allowing an employee to perform required tasks from his or her choice of location, usually home or a satellite center, by using telecommunications equipment."[16] By the end of the 20th century, telecommuting was seen as the ultimate form of flexibility in work and today remains increasingly popular and accessible to knowledge workers around the world. Connected and Sustainable Work takes flexibility, productivity, collaboration, resource optimization, and work culture to a new, 21st century level. The concept of "telecommuting" is rendered obsolete through new definitions of:

Where work is done: presenting an integrated model of centralized and distributed workspace, incorporating environments that support the individual and collective as well as social, work, co-creation, and collaboration activities.

Who does the work: redefining the worker, including talent within and outside the workgroup and organization.

How work gets done: redefining the workgroup and incorporating collaborative interactions and a platform for seamless transition between virtual and physical workspaces.

Critical Success Factors

The following elements must be present for the principles of Connected and Sustainable Work to be put into practice:

Benefits across all stakeholders: Connected and Sustainable Work must deliver business value to the employer, the community, and the worker. Any solution that denies benefits to one or more of these stakeholders is not sustainable, and will not have a viable path in the medium or long term.

Accessible and reliable infrastructure: Infrastructure must deliver the foundation for engagement, access, and execution of work, including:

- Municipal infrastructure and associated services such as communications, connectivity, transportation, and utilities
- Public policy, including legal framework, fiscal incentives, and policies that foster and formalize emerging work models
- Employer infrastructure and work-enablement services such as technology, workspace, worker support, and employment policies
- Physical and virtual work tools, including collaborative workspaces, communication tools, work metrics and audits, productivity and performance, knowledge acquisition, and exchange tools
- Tools that provide new and creative ways to find, engage, and retain talent, as well as recognize and reward contributions

16. "Telecommuting: A Study of Employee Beliefs," Mohamed Khalifa and Jamshid Etezadi, *The Journal of Computer Information Systems*, 1997.

Supportive Culture: While all of the elements outlined above can be present, it is culture that brings adhesion and consistency. The culture must be flexible, establish trust between workers and leaders, and deliver the autonomy the knowledge worker values as an individual and as part of a workgroup. The culture must foster collaboration and teamwork so that the innovative power of the collective is unleashed and the talent pool is expanded.

Implementation Roles

Cities, employers, and workers have key roles in the implementation of Connected and Sustainable Work:

- The role of the **city** as an active leader includes ensuring delivery of the infrastructure needed to support new models of work—physical, technology, and transportation—as well as policies and incentives to support adoption of these new models by the business community. Cities also have the opportunity to demonstrate the benefits of innovative work models, such as the Connected Worker and Workplace, to the business community and citizens.
- Because **employers** must shift their culture and leadership to support workers in diverse and flexible work models, their role in the implementation of Connected and Sustainable Work goes beyond investment in physical infrastructure. This shift involves increased levels of trust, new and flexible metrics for work, new organizational models, and a fresh look at the role of leadership in overseeing these new models effectively.
- **Workers** assume an active role in Connected and Sustainable Work by embracing new disciplines that involve increased self-management, the ability to collaborate with peers in remote sites effectively, and creation of trusting relationships with both leadership and peers in a more flexible and diverse environment.

Connected and Sustainable Work Solutions

As mentioned before, there are no "prescribed" solutions or formulas for the new models of work. Connected Urban Development is applying the principles and vision of Connected and Sustainable Work by delivering innovative, new solutions or applications that improve existing solutions. In this section, we will introduce two groundbreaking solutions—**Smart Work Centers** and **Hub Culture Pavilions**—along with two applications that build on existing solutions: **Connected Worker** and **Connected Workplace**.

Smart Work Centers—Bringing Work Closer to the Worker

A Smart Work Center (SWC) is an office center in close proximity to a residential community, providing space to workers in individual or group settings. Through the use of ICT, all work processes are fully supported and enhanced. Employers can take advantage of this collective setting to provide workers with flexible and scalable workspace options. The use of SWCs benefits workers by providing a physical workspace close to their residences, resulting in reduced transportation demands and increased productivity.

The SWC is a flexible concept with multiple applications, depending on the needs of various user groups. The value proposition can be as basic as a flexible workstation with connectivity, or as sophisticated as a full, pervasive collaboration environment sustaining online and offline communities. Broader services include access to interaction technologies such high-quality videoconferencing, as well as daycare for children, high-end catering services, and financial services, supplemented by easy access to highways and public transportation. SWCs are also equipped with open workspace lounges and larger public areas. Amsterdam is the first CUD city to deploy the SWC.

Figure 1. The CUD Smart Work Center Combines Multiple Services, Such as Cisco TelePresence Facilities and Child Daycare, Under One Roof

Business Modeling

The SWC delivers benefits to two key stakeholders:

1. The **SWC enterprise**: The SWC, set up as a private business, rents out flexible workspaces to organizations and individuals. The SWC offers basic packages that include workstations, connectivity, and hardware, with additional services that can be offered by third parties (e.g., child daycare or a restaurant). As such, the SWC becomes a marketplace for services that workers value.
2. The second model delivers resource optimization to the **employer**. Once the SWC has been wholly integrated into the employer's mid- and long-term resource planning, the emerging blended model delivers reductions in costs such as office space, energy, and centralized services.

Future implementations might include SWC models used by airlines to provide alternatives to physical travel or to routes and destinations for which demand is lagging due to lack of access, poor route profitability, or sagging traveler interest. Another implementation currently under consideration is using SWCs as an international franchise model, available for replication by local small- and medium-sized enterprises.

Figure 2. Sketches of Various Hub Culture Pavilion Settings

Hub Culture Pavilions—Using the Physical and Virtual Workspace

The Hub Culture Pavilion concept is being implemented through a partnership between CUD and Hub Culture (www.hubculture.com). The solution consists of a global network of urban physical spaces, or "Pavilions," that deliver a real-world communication platform linking points of interest between local and remote locations. Each pavilion venue acts as a unique node within the global Hub Pavilion network while interacting with other venues.

How will Pavilions work?

Hub Culture Pavilions enable new work models. Like Smart Work Centers, they enhance workers' ability to function more collaboratively, with less dependence on the physical location of central offices. Pavilions have the capacity to transform space and urban centers as they bring together, organize, and facilitate knowledge worker user groups, catering to workers' high-end demands.

- Pavilions are member-based entities, where an individual pays a monthly fee to join the global virtual and physical network. Membership provides access on a "drop-in" basis to all global pavilions, making them of interest to the global worker.
- Pavilions offer a convergence of physical and virtual collaboration, social engagement, and work. People can choose to engage virtually and/or in person, with no disruption. This new approach blends the advantages of remote and office work, while expanding connections among workers to a much personalized, relevant setting.
- Upon arrival, visitors are greeted by a concierge who offers connected services and local information based on the member's social/interest profile. Once inside, the user has the option to work individually, in groups, or to socialize. Connectivity is offered at no extra cost. The venue can deliver interactive services such as voice and high-quality video (telepresence) in a conference-room setting.
- Collaboration can be extended inside or outside the venue using various technologies.

Pavilion venues are connected to one another, enabling users to communicate and make connections with others who share their interests—whether by visual meeting, SMS, or other method.

Pavilions are currently being deployed in a large number of cities, including New York, London, and Hong Kong.

Established Solutions—Innovative Applications

In addition to the innovative offerings described above, CUD is also applying the principles of existing solutions to municipal knowledge workers. These new solutions—Connected Worker and Connected Workplace—use known fundamentals in combination with the principles of Connected and Sustainable Work.

Connected Worker—Bringing Services to Citizens

The connected city worker has numerous options for working, ranging from the casual remote worker, a person who occasionally works remotely, to the permanent "nomad," who is completely detached from any office space. CUD has taken these principles and created new applications of particular relevance to cities and the municipal knowledge worker.

One application consists of the municipal knowledge worker bringing services closer to the citizen. In this form of connected work, city services can be delivered in distributed points across a city, eliminating the need for citizens to visit central city offices. This is made possible by transforming municipal buildings into multifunctional citizen-service centers, with integration of a reliable networking infrastructure and municipal departments to meet the needs of citizens. In this application, city workers become "remote" to the central office, transforming a city library or a remote municipal building into a local service hub for citizens, thus delivering not only higher, localized quality of service, but also reducing stress on transportation systems for the citizens served.

Another example is municipal employees who, in the past, had to come to the central office at some point during the day to perform administrative tasks, such as submitting reports, issuing construction permits, or processing license requests or fines. A form of connected work enables a city knowledge worker to perform these tasks remotely, thus enhancing employee productivity, reducing costs, improving service levels, and minimizing stress on infrastructure.

Connected Workplace—Optimizing City Resources

Mobility has changed office workers' habits and office-space utilization. With the rise of the Internet and the mobile worker, dedicated offices and cubicle spaces are left empty, and meeting spaces and common areas are unused. In fact, up to 60 percent of office space often is underutilized and remains vacant on a daily basis. Approximately 20.7 million U.S. workers no longer report to "brick-and-mortar" offices each day.[17]

17. *Commercial Real Estate Magazine*, July 2007.

Using ICT, municipalities can transform traditional office spaces into dynamic environments that offer the flexibility and personalization required to improve workspace utilization and enhance collaboration among knowledge workers. ICT can enable services such as email, voicemail, conference calling, videoconferencing, knowledge management, intranets, and instant messaging. In addition, dynamic space assignment ("hot desk") allows workers to make use of any available space, with all services (such as voicemail) "following the worker" to the workspace. These services enable new work practices, reduce overall real estate requirements, and provide flexible settings tailored to the needs of the person or task at hand.

The Borough Council (United Kingdom) is an organization where 70 percent of staff work remotely. Staff members now have access to the information, services, and applications they need, at any time and wherever they are—whether working from home or on the road. The council saves more than €4.3 million (US$6.2 million) annually in office costs by eliminating unnecessary office space.

Challenges and Benefits

Challenges

There are several challenges in implementing the vision of Connected and Sustainable Work. City administrators play a significant role in removing these barriers, in partnership with enterprises and citizens:

Lack of investment in—and commitment to—the technology infrastructure. This investment is a result of a strong partnership between municipalities and businesses. Lack of a solid strategy, policy, and long-term funds to create the needed broadband infrastructure will impair innovation potential.

Slow and complex public bureaucracy. In order to provide incentives and support for new models of work, municipalities must implement nimble and responsive services for employers and workers. The ability to deliver policy and legal infrastructure is essential to adoption of new models. Questions about how to compensate, who owns intellectual property in a virtual community, and workplace safety are examples of issues that must be addressed.

Weak relationship between the businesses community and municipality. Lack of alignment between these two key stakeholders will limit the visibility of success and adoption of best practices; lessons learned from each innovation will remain private and proprietary, and public policy will lag behind.

Failure to recognize the importance of culture. Failure to actively promote a culture of Connected and Sustainable Work by employers and public/private stakeholders is likely to hinder adoption by workers.

Benefits to the Urban Environment

The implementation of Smart Work Centers by Amsterdam and the upcoming deployment of Hub Culture Pavilions in cities around the world demonstrate that there is interest in innovation around work by cities, workers, and employers. When evaluating the potential benefits of successful adoption of the Connected and Sustainable Work model, several benefits begin to emerge. For cities, these include diminished stress on physical infrastructure (roads, public transportation, energy) and the benefits derived from a reduced carbon footprint. In addition, by delivering a higher quality of life, cities can more effectively attract talent and investment, fostering growth.

In his book *The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life,*[18] Richard Florida states, "Access to talented and creative people is to modern business what access to coal and iron ore was to steelmaking. It determines where companies will choose to locate and grow, and this in turn changes the ways cities must compete."

Implementations such as the Connected Municipal Worker and Workplace models deliver benefits from improved, more accessible service levels, as well as optimized use of public funds to help the municipality operate most effectively.

For employers facing increasing challenges in attracting and retaining talent, as well as an increasing demand for higher productivity and service levels, the new models of work significantly expand the talent pool through the virtual workspace. By enhancing autonomy and flexibility, knowledge worker satisfaction grows, driving significant increases in productivity, engagement, and retention.

For workers, the new models of work provide an opportunity to better integrate work and life successfully, as well as the ability to achieve a high quality of professional fulfillment through access to peer and expert talent that, under traditional models, would remain untapped.

18. Basic Books, 1st edition, April 30, 2002.

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