Connected and Sustainable Buildings

Written specifically for Connected Urban Development Global Conference 2008
by the Cisco Internet Business Solutions Group

Overview

The transformational influences of 21st century information and communications technology (ICT), and the resulting knowledge-based economy, are as significant as the two major waves of "network" innovation that characterized 20th century urban design and development. The first happened at the beginning of last century, triggered by the age of steel, electricity, and heavy engineering, resulting in electrical networks. The second took place at midcentury, with the automobile and other forms of transportation spurring suburbanization and sprawl through networks of roads, highways, ports, and airports.

Today, worldwide digital communications and the Internet are becoming the fourth utility in cities (in addition to roads, water, and electricity). Similar to the beginning of last century, when newly built electrical networks were the focus, today's citizens, governments, and enterprise organizations are taking advantage of digital services delivered over the Internet.

Cities are now looking to apply this "fourth utility" to the development of sustainable buildings that help provide a higher quality of life and a reduced environmental footprint.

Connected Urban Development Perspective

As populations of cities overtake those of rural areas for the first time in history, sustainability and technology are emerging as two sides of the same coin: both are innovations for cities seeking to improve their environmental effectiveness in the context of connected societies, global competitiveness, economic development, climate change, and demographic shifts. Because the form and function of built environments are responsible for 75 percent of global energy consumption and greenhouse gas emissions, most attention in sustainable urban design and development has been directed to three sectors: buildings, transportation, and energy. Today, it is becoming evident that a fourth, equally important element must be addressed: urban ICT.

When it comes to urban sustainability, ICT is part of the problem (based on its contribution to overall energy consumption), but an even bigger element of the solution. A recent study, for example, found that ICT is a significant contributor to energy efficiency: for every extra kilowatt-hour of electricity demanded by ICT, the U.S. economy increases its overall energy savings by a factor of 10.[1]

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1. "Information and Communication Technologies: The Power of Productivity, How ICT Sectors Are Transforming the Economy While Driving Gains in Energy Productivity," American Council for an Energy-Efficient Economy, February 2008

Urban ICT contributes to the sustainable development of buildings and cities in three ways: directly, indirectly, and systemically:

- *Direct effects* are caused by urban ICT infrastructures. Mature cities already estimate that the direct ICT contribution to their environmental footprint is as large as 15 percent.

- *Indirect effects* result from usage of ICT applications—for instance, the virtualization and collaboration of design, construction, and operations services, as well as visualization and analysis of the sustainability performance of built environments. This has a positive impact on the environment.

- *Systemic effects* link the network impact of ICT to society at large, with implications for urban design, development, and policy tools. While these long-term effects will have the most significant impact on sustainability, they are not well understood.

Discussion Points

1. What is the role of ICT networks in creating sustainable buildings and cities?

2. Which opportunities arise to develop cities that are more multifunctional and compact, while offering a higher quality of life and a reduced environmental footprint?

3. Which sustainability benefits can ICT deliver to other major urban networks (such as buildings, mobility, water, education, workplaces, and so forth), and what must cities do to realize those benefits?

4. How will ICT innovations that are catalysts for changes in personal, work, and community life affect city design and development?

5. How can cities create an information model to map and measure urban sustainability?