

# The Value of Universal Design in the Workplace

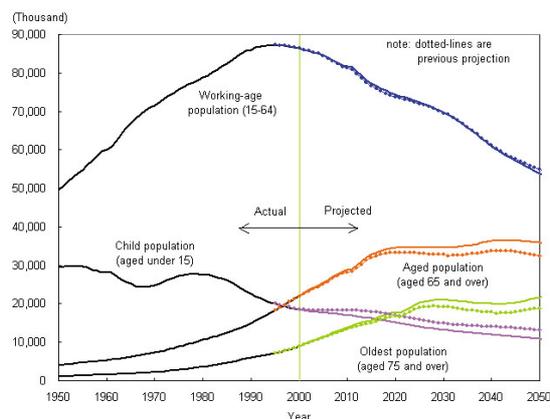
A conservative estimate has it that 70,000,000 in 2028 will shrink to 48,680,000 in 2050.

Presenters: Kanya Shiokawa, Hitomi Hagino  
Collaborators: Ken Adachi, Yoko Ichikawa, Takanori Ochiai, Toshio Komachi, Dai Sogawa, Yukiko Nakada, Shiro Nitani, Ichiro Narita, Kaori Horiguchi, Masayoshi Moriyama (Jobsite Universal Design Study Team, Japan Facility Management Promotion Association)

## 1. Introduction

In Japan, aging is progressing at a speed rarely observed elsewhere in the world. According to a National Institute of Population and Social Security Research (NIPSSR) estimate announced in January 2002, Japan's population will peak out in 2004 at 127,480,000, after which it will decrease to 92,030,000 in 2050, among whom 39% will be 65 years of age or more. The nation's population of working-age adults (15–64 years of age) constantly grew since the close of World War II, reaching 87,170,000 in 1995, after which it dwindled to 86,380,000 in 2000. Inasmuch as estimates have it that this precedent will continue, there is no reason for the status of labor to remarkably change.

In 2001 the number of in-home people with physical disabilities aged 18 or more, who could be considered as potential workers, was estimated at about 3,250,000, which is increasing compared with the fact that the number of the same group was about 2,990,000 in 1996. According to a Ministry of Health, Labor and Welfare survey on employment for the disabled conducted in 2001, approximately 190,000 people with disabilities are retained by businesses and institutions, for a very low ratio of 5.4%. In spite of the fact the Law for Employment Promotion, etc., of the Disabled Persons set the employment quota of persons with physical or intellectual disabilities working in the private sector at 1.8%, as of June 1, 2001 the actual ratio was only 1.49% (MHLW 2001a, 2002a, 2001b).



As in the past, public space has been comprehensively treated as seen in the Law for Buildings Accessible to and Usable by the Elderly and Physically Disabled Persons (the Heartful Building law) and the Law for Promoting Easily Accessible Public Transportation Infrastructure for

the Aged and the Disabled (Transportation Accessibility Improvement Law). For housing, the introduction of barrier-free residential facilities has been promoted primarily by home builders, based on the needs of elderly citizens. Regarding the use of barrier-free or universal design at the jobsite, although the amendment of the Heartful Building Law made during the National Diet session of July 2002 now requires applying efforts in the barrier-free issue, evidently it has not been discussed fully compared with the issues of public space and housing for several reasons.

Firstly, compared with public space, the jobsite is a venue for various corporate activities as it takes various forms such as offices, shops and factories. Unlike the application of Law for Employment Promotion, etc. of the Disabled Persons and the like to employment issues, consideration of physical work environments is typically a case-by-case basis. Therefore, the introduction of barrier-free or universal design is at the discretion of individual firms. Additionally, in the past, jobsite users were viewed as “uniformly strong workers,” that is, healthy, Japanese male adults. Consequently, except for specific occupations, the need to consider diverse workers including elderly people, those with disabilities, women and foreigners has not been felt as strongly as in the case of public space and housing.

Nevertheless, Japan is entering a hyper-aging and global society. From the standpoints of social fairness and corporate management, diverse types of workers no doubt will be needed in the future. Universal design at the jobsite and hiring a variety of workers are like two wheels of a cart. Unless the workplace is prepared, ideal employment cannot be promoted even if we strive toward it.

Under these circumstances, Japan Facility Management Promotion Association (JFMA) organized the Workplace Universal Design Study Team to examine the feasibility of universal design at workplaces. Preparing for the era facing us, we wanted to propose guidelines, or criteria, for jobsite improvement while clarifying the value of universal design in management. Moreover, in line with the recent trend of coping with future social changes, we also intend to focus on the following movements that backs up the introduction of universal design to the jobsite, particularly offices: the rise of Social Responsibility Investment (SRI); the political power of pension funds; facilities as social infrastructure; and the increasing social responsibility of enterprises.

This treatise maintains the stance of “universal design as seen from the standpoint of facilities.” Since facility management is business practice, this research was conducted to make it as practical as possible rather than academic, pointing in a general direction instead of limiting targets by stressing exactitude. It also diverges from idealistic stances like “society as it should be.” We ardently hope to see universal design introduced to the workplace in future and a variety of persons, including elderly people and those with disabilities, leading a rewarding vocational life. The objective of this research is not to promote universal design itself but to clarify its value in the workplace and propose meaningful implications for its introduction to active players, the employer and jobsite users. We shall be delighted if this research can serve as a catalyst for achieving it.

## **2. The objectives of this research**

With Japan entering an aging society, jobsites, mainly offices, that accommodate workers with a variety of physical abilities doubtless will affect the asset value of corporate facilities. We shall examine the impact of universal design on workplace management and provide guidelines for planning toward its introduction.

## **3. Contents of this treatise**

The overall research consists of seven chapters (as shown below), but in this treatise, chapter 1 to 3 and the opening part of chapter 4 will be introduced:

- 1 What is universal design?
- 2 Social trends surrounding universal design in the workplace
- 3 Value of universal design in management
- 4 Guidelines for universal design planning
  - The stage of acquiring real property
  - The stage of planning a base building
  - The stage of planning a building interior (furniture, fixture and equipment (FFE), or fix-out)
  - The stage of operation and maintenance
- 5 Research on universal design at enterprises
  - Interviews with top executives
  - Interviews with facility managers
  - Interviews with workers
- 6 Corporate benchmarking surveys
- 7 Evaluation of universal design at the workplace (UD building evaluation)

## **4. Targets of this research**

### **(1) Target jobsites**

Offices, factories, shops, research institutes, transport facilities, hospitals...all these and more form jobsites. This treatise, however, will focus on offices because they are where the majority work and many features can be shared regardless of business category. We believe this research will serve as a reference when introducing universal design to jobsites other than offices, too. While offices in a broad sense include homework, we shall omit it here as its facilities can be customized according to individual requirements.

### **(2) Target workers**

Although we will ultimately intend to include as subjects all persons willing to work, this treatise primarily targets those who can commute to their jobsites and be qualified by their employers. Although Japanese workers currently retire at age 60 or so in general, we presume that, in the coming hyper-aging society, it will be more important for organizations to retain experienced persons over 60, or even over 65, who want to work and talented persons with disabilities who have professional skills. Accordingly, in addition to office workers without disabilities, we have included among our targets elderly people and those with disabilities who can commute to offices and engage in intellectual work proficiently.

## **5. What Is Universal Design?**

Briefly described, universal design is making inroads into Japan based on a growing aging society. At the core of it lie human rights for all and the concept of social design that seeks an environment with greater comfort in life. This chapter will treat the history of universal design and its current trend.

### **(1) Universal design as advocated by Ronald Mace**

Universal design is defined as the “design of products and environments usable by all people to the greatest extent possible, without the need for adaptation or specialized design.” Applicable to all ages, personal abilities and shapes, with an inclusive power that transcends barrier-free and accessible design, it was advocated in 1985 by Ronald Mace, an architect who had a disability. Sometimes universal design is synonymous with inclusive design, adaptable design, transgenerational design and lifespan design.

The emergence of universal design changed the courses of architects, engineers, product designers and environmental designers who had received a conventional education in product development for persons without disabilities. Until then, the market for people with disabilities meant developing products and environments for specific, limited needs. Products having special specifications are often expensive, unattractive and neglected by the public. For example, installing a new ramp at a building entrance is convenient for people who use wheelchairs, but, on the other hand, it might lead to discrimination, detract from the building's appearance and actually costs a lot. Moreover, it is impractical to design a building for only persons in wheelchairs. Doing so unnecessarily separates persons with disabilities from those without, and the investment in special construction is too costly.

Considering the cases of private homes may make it easier to understand why it is important to incorporate devices that support physical inconvenience from the outset, rather than altering as physical functions decline. Compared with accessible design or the barrier-free idea, universal design serves broader user needs while maintaining aesthetics. While accessible buildings have entrances and toilets for the exclusive use of people with disabilities, universal design offers entrances and toilets compatible with both persons with or without disabilities . In addition to a wide doorway and no differences in level, a main entrance is conveniently adjacent to parking lots and provided with visual, tactual and aural guide measures. But to realize universal design is a lofty ideal: No design can fulfill the needs of all users. Thus, what we are aiming at is to make design as universal as possible by continuous efforts to improve .

## **(2) Seven principles of universal design**

The basic concept of universal design is simple; To suit a wide range of abilities as shown by the gamut of individuals. The following seven principles describe the process of universal design so they can serve as guidelines for designers and users (The Center for Universal Design, 1997).

1. Equitable Use  
The design is useful and marketable to people with diverse abilities.
2. Flexibility in Use  
The design accommodates a wide range of individual preferences and abilities.
3. Simple and Intuitive Use  
Use of the design is easy to understand, regardless of user's experience, knowledge, language skills, or current concentration level.
4. Perceptible Information  
The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities
5. Tolerance for Error  
The design minimizes hazards and adverse consequences of accidental or unintended actions.
6. Low Physical Effort  
The design can be used efficiently and comfortably and with a minimum of fatigue.
7. Size and Space for Approaching and Use  
Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility

## **(3) Marketability of universal design**

Universal design advocates converting distinctive specifications of products and environments to general ones. Specialized products, typically used in such places as hospitals and welfare facilities, are costly and the demand for these products is relatively small due to the limited range of users. Designing and marketing more products based on universal design will make

them a major commodity appealing to a wide range of users. Moreover, if a number of manufacturers collaborate in universal design, the cost will even lower according to the principle of market mechanism.

Universal design offers not only attractive products to a wide range of people in terms of age, needs, ability and sensitivity, but also yields profits. Accessible toilet stalls are useful not merely to people in wheelchairs but to mothers with baby buggies and travelers with luggage who find ordinary toilet stalls too cramped. Spring scissors of symmetrical shape are useful not only to persons with a weak grip, but also to anyone, including those who have either right- or left-dominant hands. The lever handle of a door or a cabinet is easier to grip and turn than slippery knobs, and large telephone buttons offer ease of reading and operation. Accessible buildings are good for everyone. Spacious layouts, such as large bathrooms, kitchens, doors and corridors, go far to attract buyers or tenants.

**Ronald Mace**

Born in 1941 in New Jersey. Architect and product designer. The first executive director of the Center for Universal Design annexed to the College of Design, North Carolina State University. Worked in developing design programs for persons with disabilities as well as in the enactment of access rights legislation and the establishment of its criteria. Advocated universal design in 1985. Received the North Carolina Honorary Citizen with Disabilities Award in 1992, the Distinguished Service Award of the President of the United States in 1992, and the American Institute of Architects Award in 1996. Died in 1998. (Excerpt from a quarterly journal *Universal Design*, Mace, 1998)

## **6. Social trends surrounding universal design in the workplace**

Eight overlapping and intertwined social currents support universal design in the workplace. Expressed simply, one has it that “offices as a social existence” will be sought in future societies; owners of private sector office buildings are urged to assume a more society-oriented existence. Another has it that “human-centered offices ” are sought as places to create new business values. Beyond such social currents lies universal design as a powerful concept symbolizing “sociality” and “humanity.”

### **(1) Obligation to make effort under the amended Heartful Building Law**

At the July 5, 2002, plenary session of Japan’s House of Representatives unanimously passed a bill to amend part of the Heartful Building Law regarding the accessibility and usability of buildings for elderly people and those with physical disabilities that obligates public facilities, such as department stores and theaters, to implement barrier-free measures . The amendment expands the range of targeted buildings to places used by many but even limited users, such as schools, factories, offices and condominiums. For the owners of these buildings, as a result, it has become an “obligation to make efforts” to achieve the basic level of standards in the law (MLIT, 2002).

The amended Law has already had a powerful influence, one being that office buildings are now officially included in its provisions, even though it still allows discretion of office building owners. Thus, in the construction of new buildings, it is quite likely that owners will plan their buildings to satisfy its criteria since there may be a further revision to upgrade the “obligation of efforts” to mandatory. This, in turn, will support the introduction of universal design as a de facto standard for office buildings. Another effect is that this amendment will herald the state of “being-virtually-mandatory” in the future, as seen in the trend that numerous local governments have rushed to establish rules for welfare city planning that requires the use barrier-free measures.

## **(2) Need to improve intellectual productivity at the office**

Expectations have it that Japan's office building market is destined to shrink owing to a decline in labor supply and the diffusion of the "anytime anywhere" work style. Moreover, an office building surplus is expected due to a rise in long-life office buildings resulting from concerns with high construction costs and sustainable environments. This will call for offices supporting intellectual creativity that increase productivity of each worker by improving work environments

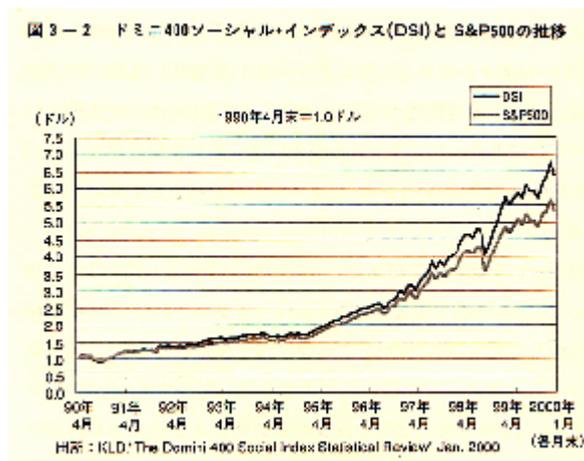
There are two directions regarding the workplace. One is the presence of central offices, or conventional office buildings. Owing to the diffusion of the information technology, workers are faced to consider the value of the time and effort to commute to central offices. The meaning of face-to-face work, that is, creating values through communication and collaboration, sharing corporate culture and the like, will constitute the value of centrally located offices, and universal design will play an important role in forming such a worker-centered environment.

Another is an increase in so-called non-territorial offices, such as satellite offices, used by unspecified workers. Here, since customization assuming specific users is impossible, universal design available to anybody becomes an effective tool as well as effective strategy to serviced rental office providers, such as Regus and Executive Center. On the other hand, with home offices where workers are specific, customization for individuals may be more effective than universal design as in private residences.

## **(3) Social Responsibility Investment (SRI)**

In the Occident, SRIs are popular, which generally means economic activities that evaluate and select investments in consideration of social factors, including products, environment, human rights and employment, in addition to the measures of the conventional equity investment trust, such as corporate earning growth. SRIs is expected to expand more. People will become aware of their social responsibility more value in such social investments than pure fiscal worth. In other words, the number of investors or investing institutions who intend to materialize their wills through SRIs is foreseen to grow.

According to Ms. Mizue Tsukushi, CEO of Good Banker Co., Ltd., a firm that created an eco fund as the first SRI in Japan, many countries allot about 10% of their funds circulating in the market to SRIs. In the case of Japan, it is no wonder that about 130 trillion yen will be routed to SRIs since the size of Japan's household financial asset market is about 1,300 trillion (Nature Net, 2000). Then, as the nation's demographical aging grows increasingly conspicuous as a social problem, most probably universal design will become the subject of SRIs once it is recognized as one of the criteria for social responsibility in Japan's aging society. Meanwhile, financial institutions are desperately seeking a way to interest middle-aged and elderly people in their financial products. SRIs in this regard should emerge as attractive.



The "Domini 400KLD Social Index" (DSI = stock movements of 400 firms that excel in measures geared to social and environmental problems) launched by KLD Research and Analytics, Inc., shows the stock prices of the 400 as 1.19 times higher (6.385/5.349) April 1999 through January 2000 compared with those of S&P500.

#### **(4) From real property to social infrastructure**

Drastic changes are occurring in the real property industry, largely because the criteria for evaluating the value of real property have shifted from the book value to the current price. This is a shift from a conventional value in Japan, that is, to own land and use it as collateral for a bank loan, to the global standard for assessing the value of real property based on its profitability. Securitization of real property developed in the U.S. during the 1970s and found its place as a financial commodity, which is compared and evaluated on the same plane as corporate bonds and stock certificates. It is required, however, to establish asset value evaluation criteria equal to other securities and the transparency of corporate activities through due diligence in order to maintain its marketability.

In the U.S., the Real Estate Investment Trusts (REITs) have formed a 15 trillion yen market in capital markets (MMD, 2002), and in the U.K., the Private Finance Initiatives (PFIs), which target public facilities, have enabled project development through investor funds since the Thatcher Administration. The securitization of real property has been recently introduced to Japan on a large scale, with Japanese versions of REITs and PFIs now in operation. Consequently, the value of real property is strictly examined and analyzed from legal, economic and physical aspects to determine its asset value, hence a way of thinking to perceive it as a social asset.

#### **(5) Influence of universal design on the corporate brand value**

According to a report by the Corporate Brand Value Evaluation Workshop of the Ministry of Economy, Trade and Industry (METI, June 24, 2002), enterprises are shifting their paradigm from tangible management based on financial and equipment assets and land, to intangible management based on intellectual property, research and development costs, and know-how. This paradigm shift is accompanied by such management environment changes as softening of economy, globalization, and the development of the information technology.

U.S. companies have recently invested \$1.2 trillion (144 trillion yens) in tangibles and \$1 trillion (120 trillion yens) in intangibles; whereas among Japan's top 200 companies listed on the first section market, 324 trillion yens (\$2.7 trillion) in tangibles and 144 trillion yens (\$1.2 trillion) in intangibles. While tangibles barely yield an average return on investment ratios, intangibles have become a key value driver, a determinant for corporate value. Just as ecological and sustainable design, universal design of corporate facilities can be recognized as a corporate declaration of the social responsibility and value in an aging society. Even though facilities are themselves tangible assets, the introduction of universal design will influence intangible assets, such as the corporate image, the brand value, the corporate culture and social responsibility, and in the long run will favorably affect the corporate value itself.

#### **(6) Entering an era when building performance sets real property value**

The real property industry is concerned with "the 2003 problem," referring to a surplus of new buildings against poor demand for office buildings. A huge number of office buildings of about 1,600,000 square meters are taking form in central Tokyo in 2003, featuring high-quality and large scale (Nikkei BP, 2002). Many expect that large enterprises will take advantage of this to integrate their offices, with the vacancy rate of older office buildings to climb in the backwash. This overabundance will tend to change the corporate real estate market favoring tenants, hence a

pressing need for the owners of older properties to upgrade the physical performance of their buildings and/or improve services to retain their tenants; otherwise, they find themselves obliged to slash rents.

A decline in land prices is another harbinger of an era in which building performance heavily influences property values. During the period of Japan's bubble economy, a building value was only about a tenth of a realty value as a whole. Since then, the ratio has climbed to 30 to 40% owing to falling land prices (Nikkei BP, 2002).

In the past, an office building value (rent, etc.) was determined mainly by location, but now it is strongly influenced by building features, such as earthquake-resistance, security, space flexibility, heating/ventilation/air conditioning (HVAC) efficiency, electrical capacity, reduced environmental impact and the appearance of buildings. Thus, evidently we have entered an era when tenants can choose where they lease based on the performance of office buildings.

**Tokyo Office Market's "2010 Problem"– Excerpt from NLI Research Institute data (NLI Research Institute, 2002)**

Estimates have it that in case that current employment conditions remain, the number of office workers in central Tokyo will decrease by 5% during the decade from 2000 to 2010 due to the progress of an aging society. In particular, since a significant decline in workforce is anticipated between 2007 and 2009 owing to the retirement of baby boomers (if doing so at age 60), "the 2010 problem" has emerged as a new key term in today's corporate real estate market. As a result of their retirement, an office demand of up to 3,700,000 square meters will vanish from the market. Meanwhile, corporate management will have to take account of extending the age limit for retirement and increased hiring of foreign office workers. "The 2010 problem" also implies the need for universal design in offices.

**(7) Greater responsibility of corporate leaders for occupational safety and health**

In Japan's work environments, concerns about workers' occupational safety and health are gaining significance year after year. For quite some time, people have talked about the problems of worker accidents and smoking in the office and recently, computer-work-related disorders and mental impairments caused by excessive stress have become aggravated. American corporate executives and facility managers are more sensitive to these issues than their Japanese counterparts since workers' compensation costs for work-site deaths, injuries and diseases easily squeeze the bottom line. Reportedly, during 2000, 6.1% (5.7 million) of all employees in the U.S., or 50 persons per minute, suffered occupational injuries or diseases (DoL, 2001). For these employees, private organizations paid \$128 billion (15 trillion yens) a year and the Federal and state/local governments paid \$97 billion (11 trillion yens) for insurance, workers' compensation, and related expenses (National Safety Council, 1998; National Academy of Social Insurance, 1996). This, then, dumps a heavy burden on both public and private sectors. American corporate directors also fear lawsuits filed by employees. According to inspections by the U.S. Occupational Safety and Health Administration (OSHA, 2002) among 91,845 businesses in 2001, lawsuits from employees accounted for 27% (24,424 cases) of the total filed, with the aggregate of penalties reaching \$156 million (about 18,700 million yen). Moreover, many large building material manufacturers found themselves forced to file for Chapter 11 bankruptcy protection or pay exorbitant compensation to users because of "sick building syndrome" lawsuits.

These suits are drawing the attention of facility managers. Universal design holds great expectations not only to reduce accidents and illnesses in the workplace, but also to cut workers' compensation costs and lessen the risk of lawsuits. For instance, a report has it that the rates of industrial accidents and diseases at firms that have adopted ergonomics guidelines offered by OSHA have fallen to less than half of those that do not follow the guidelines, and that more than 80% of the costs related to industrial accidents can be reduced (OSHA, 1999). The introduction of universal design can go far to prevent jobsite accidents and illness. Even when workers do incur an

accident or disease, universal design can help their early return to work, which leads to protect both employees and enterprises.

### **(8) Liquidation of human resources**

Common knowledge has it that in recent years, thanks to such factors as changes in the composition of the working population and the advent of the information technology, the liquidation of human resources has accelerated. According to a 2001 survey by the Ministry of Health, Labor and Welfare (MHLW, 2002b), enterprises attaching importance to lifelong employment represented a mere 8.5% of the total, for a marked contrast with the answers gathered in 1990 that about a third of respondents valued lifelong employment. Instead, 55.9% of the companies regarded the merit system as most important, indicating a collapse of Japan's lifelong employment system, replaced by a trend to secure optimal human resources as needed. A decreased number of full-time employees and more part-timers also attest to corporate demands for flexible recruitment of individuals with adaptability and a fighting spirit. Statistics for 2001 show that, while the number of full-time employees declined by 110,000, the figure for part-timers had climbed by 210,000, compared with the previous year (MHLW, 2002c).

To satisfy the craving of enterprises for talented workers, elderly people and those with disabilities should be incorporated into the active human resource market. Under these circumstances, there is a growing need for facility managers to prepare their workplaces so that they can welcome diverse workers at any time.

From the worker's perspective, there are increasing workers who, mainly among young generations, want to change their jobs to firms offering better conditions and a chance for self-fulfillment. This, then, has led to a growing number of enterprises that improve their facilities to prevent the outflow of talented workers. A large American network-related firm clearly stated that a reason for office enrichment, particularly in employee amenities, is to keep young and brilliant employees who are in great demand and susceptible to headhunting in the company. A survey by Steelcase, Inc. (2001) also revealed that more than 10% of all American companies replied that physical comfort of offices affects turnover and recruitment costs.

The introduction of universal design to the workplace will boost its comfort and attractiveness for employees, which consequently helps to secure excellent human resources who can contribute to corporate competitiveness.

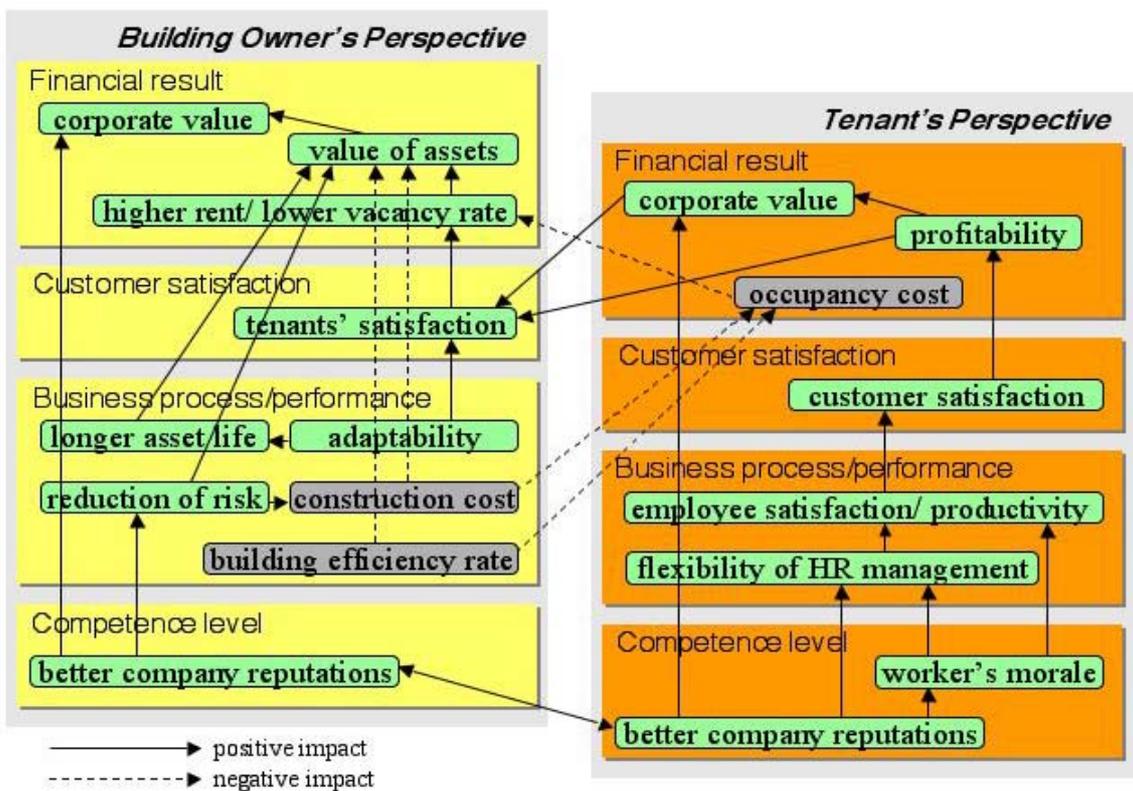
## **7. The Value of Universal Design in Corporate Management**

Unlike the cases of public spaces, an understanding by management is essential for the introduction of universal design to the workplace. Managers want to know how universal design – its advantages and disadvantages – will affect corporate administration. In this chapter, we shall propose a tool, the balanced scorecard, to facilitate managers' decision-making. The balanced scorecard can be used to assess the influences of universal design on the workplace.

The balance scorecard provides a way to evaluate corporate management from four perspectives: financial (Can it be linked with profits?), customer (What do customers regard?), internal/business process (Can the operation be streamlined?), and leaning and growth (What are long-term advantages?). The balanced scorecard is an excellent multifaceted assessment method because it is based on the concept that, in addition to short-term profits (finance), an enterprise must maintain good relationships with stakeholders, including shareholders, customers and employees, in order to prosper over extended periods. In fact, many prominent American firms have adopted the balanced scorecard in their management. Here, we attempt to apply it as a template when assessing the strategic effectiveness of universal design.

First, the management group responsible for a decision to adopt universal design is divided into (1) office owners (or property managers) and (2) office tenants (or facility managers). At times, the interests of the two are in conflict each other, but their respective advantages and disadvantages are mutually interrelated. A “map” is used to sort out the relationships of each item included.

For example, through the introduction of universal design, the morale of workers on the tenant side rises, which leads to employee satisfaction and boosts productivity. This links with improved profits and corporate values, and consequently, for the owner side, it means advanced customer satisfaction, through which owners can expect higher rents. On the other hand, if the owner adopts universal design, which might lead to increased construction costs and a lower building efficiency rate, the tenant will fear that the rent will be raised, which in turn will adversely influence the owner side with respect to customer satisfaction. The following shows the causal relationships of interests between the two groups, citing the upbeat aspects of introducing universal design as “positive fact” the downbeat aspects as “negative factors.”



Universal Design Analysis Using the Balanced Scorecard

**(1) Office owner’s standpoint**

*Financial viewpoint*

Enhanced corporate value (positive):

Corporate worth consists of tangible and intangible assets. The former increases fixed asset values, while the latter enhance corporate brand values by gaining better reputations among customers.

Enhanced asset value (positive and negative):

Based on the income approach, short-term asset values are affected by such factors as a lower building efficiency rate, higher rent, and improved building performance (earthquake-resistance, space flexibility, HVAC, electrical capacity, the appearance of

buildings, etc). In the long term, asset values are influenced by social durability and risks of buildings.

Expectation for higher rent and lower building vacancy rate (positive):

Universal design serves as a factor to differentiate rent.

#### *Customer viewpoint*

Enhanced tenant satisfaction (positive):

Improved usability boosts tenant satisfaction.

#### *Internal/business process viewpoint*

Preparation for future de facto standards and institutional risks (positive):

Should the working-age population grow older and universal design become de facto standards, offices without universal design cannot survive. In addition, we cannot ignore the possibility that Japanese government will establish more strict regulations like the Americans with Disabilities Act (ADA) in the U.S., as a hyper-aging society grows. Since it later alterations cost several times as initial installation costs, introducing universal design from the outset as a risk-avoiding measure is strongly recommended as most economical.

Extended office building durability (positive):

The latitude created by introducing universal design accommodate market demands in the long term.

Increased construction costs (negative):

Higher construction costs raise the depreciation allowance and facility occupancy costs, hence reduce profitability.

Decreased building efficiency rates (negative):

According to the income approach, an asset value is proportionate to a building efficiency rate.

Improved adaptability (positive):

By setting universal design as a precondition from the start, responses to customer needs can be made quickly by conducting minimal renovation.

#### *Leaning and growth viewpoint*

Image-forming as good facility providers (positive):

Office owners gain advantages among societies, which represent customers as a whole, in terms of reputations, the corporate brand value, and corporate cultures, and social responsibility. They can also strategically take advantage of the concept of universal design for corporate image enhancement.

## **(2) Office tenant's standpoint**

### *Financial viewpoint*

Enhanced corporate value (positive):

The introduction of universal design can lead to office tenant to enhance corporate reputations and brand values.

Improved bottom line with higher productivity (positive):

Universal design brings the hiring of talented elderly people and those with disabilities, and enhanced productivity of all employees. However, increase in total facility costs due to expanded square footage is a negative factor.

Higher rent stemming from improved specifications (negative):

Universal design lowers a building efficiency rate increases construction costs, and enhances the market value, all of which will affect the rent.

Higher total facility costs (negative):

In addition to an increase in required square footage (e.g., due to widening passages), a lower building efficiency rate and higher initial construction costs influence the rent.

#### *Customer viewpoint*

Reputation with customers (positive):

The corporate reputation and image are improved among respect customers or business contacts.

#### *Internal/business process viewpoint*

Enhanced employee satisfaction and higher productivity (positive):

Universal design enables workers with physical disabilities to display their competence. The sequential improved usability favorably influences the productivity and satisfaction of even workers without disabilities.

Expanded hiring of talented elderly people and those with disabilities (positive):

With universal design, a firm can retain talented elderly people and those with disabilities who in the past were simply ignored. Moreover, it allows employers to avoid penalties when they fall short of the employment quota set by the Law for Employment Promotion, etc. of the Disabled Persons.

#### *Learning and growth viewpoint*

Improved corporate reputation (positive):

Tenant firms can enjoy favorable influences in terms of corporate reputation and culture, and social responsibility.

Higher employee morale (positive):

Enhancement of the corporate perception to society and offering an excellent environment for workers improve employee morale.

## **8. Influences on the Asset Value of Office Buildings and Productivity – Overview**

With the above qualitative analysis of universal design assessment criteria, we attempt to develop tentative models to quantitatively measure the impact of universal design on the asset value of office buildings and workers' productivity, both of which form the main concerns of property and facility managers. Although it is impossible and inappropriate to quantify all aspects of the impact, the outlines of the models introduced here are based on case studies that employ the quantitative methods of workplace assessment. Additional five aspects (shown as item (3) to (7)) will be developed in the future.

### **(1) Enhanced office building asset value**

Basic building structure (e.g., earthquake-resistance, floor height and floor weight capacity) and building core (e.g., elevator shafts, stairwells, mechanical spaces, toilet rooms) are components difficult to change after a building is completed. When a universal design-related regulations are tightened, a tremendous outlay will be needed to implement. Accordingly, it is beneficial in the long term to take into account flexibility and adaptability from the initial planning. Besides, buildings with highly flexible and adaptable rooms around building structure and core) are appealing and long-lasting, which will raise asset values in the future.

**(2) Increased workers' productivity**

Workplace settings, including office layouts, furniture, fixture, equipment, virtual environment (lighting), and air quality, comprise important factors directly concerned with worker's comfort and efficiency. Thus, worker's productivity is strongly influenced by workplace settings that appropriately accommodate the needs of workers.

**(3) The level of ease to comply with prospective de facto standards and institutions**

**(4) Expanding necessary square footage and reducing building efficiency rates**

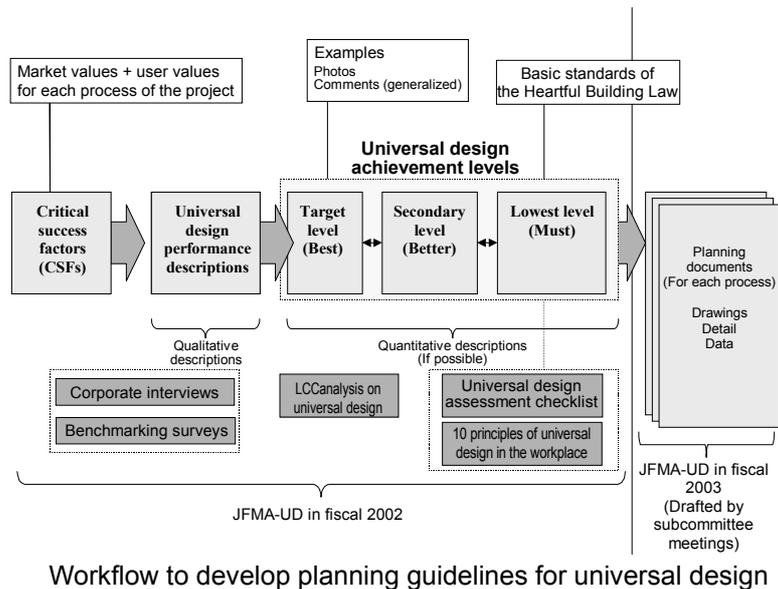
**(5) Enhancement of corporate reputation among society**

**(6) Expanding employment opportunity for elderly people and those with disabilities**

**(7) Higher construction costs**

**9. Planning Guidelines for Universal Design in the workplace**

When enterprises plan the new construction, alteration, lease or purchase of workplaces, including office buildings, it will become more important to plan or assess facilities in terms of universal design responding to the needs of management and users. We shall now present guidelines for facility managers, the basic features of which are discussed below.



**(1) Ways to develop planning guidelines**

**1) Workflow to develop guidelines (how to analyze critical success factors and establish the levels of goals)**

First, critical success factors (CSFs), which form the keys to assessment and planning, are analyzed. Doing this requires consideration for major processes of facility planning, the acquisition of real property, base building planning, interior planning, and maintenance and operation. The two dimensions, "an increase in the asset value of facilities" and "enhancement of worker's productivity," is also taken into account.

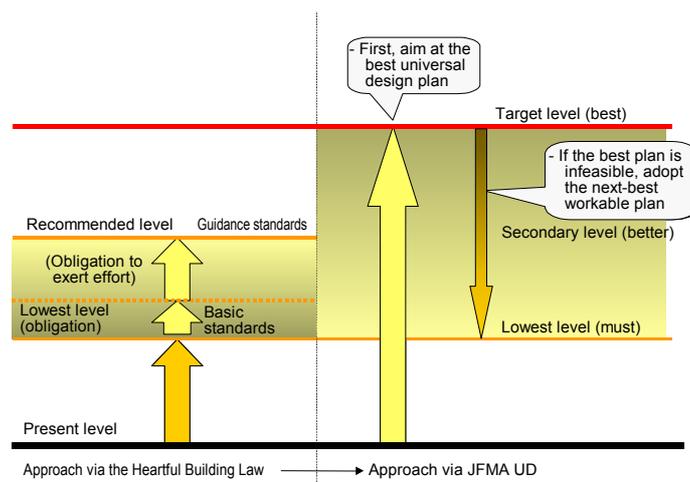
As examples of CSFs, the base building planning includes analyses such as access to buildings, floor access (e.g., stairs, elevators, corridors, signs), and specifications of each space (e.g., toilets); in the building interior planning, access to office space (e.g., circulation, doorways, signs), unit space (e.g., workstations, support areas), environment (e.g., lighting, air conditioning), and materials (e.g., finishing, colors) are considered. As the flow chart shows, each CSF includes a performance description, qualitatively addressing the required essentials, and achievement levels (target, secondary and lowest levels), describing quantitatively. Target levels are based on user interviews and case studies of other enterprises.

**2) Developing the levels of goals**

Typical legal approaches under the Heartful Building Law tend to show minimum, quantitative criteria raising the current level of practices. Accordingly, many facility planners misinterpret these criteria as sufficient requirements.

Contrary to the above, an approach we adopted set performance goals qualitatively described as the most desirable state of facilities (the best universal design plan) for diverse workers, including persons with disabilities. Namely, the starting point is to consider, based on personal interviews, what type of accommodations is most appropriate for a person who has a particular type of disabilities; then, if the best plan proved infeasible, the secondary level of goals (a better universal design plan) should be developed with specific ideas or figures.

This method enables facility planners to find a solution of the highest level possible without adhering to the conventional idea that it will suffice so long as the lowest level is maintained.



Approach to target level

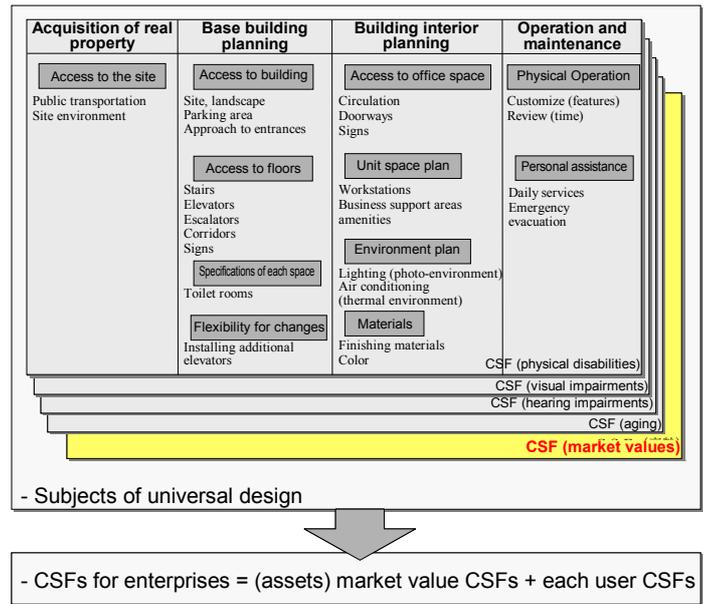


Image of planning guideline application

**(2) Application of planning guidelines (universal design assessment of buildings)**

This planning guidelines serve as a useful tool when enterprises plan newly constructing, altering, leasing or purchasing workplaces (office buildings).

The first step is to grasp needs for universal design at the level of a corporate facility strategy. For instance, when there is a corporate objective that workplaces are made to facilitate the employment of persons with visual impairments and prepared for the prospective need of people in wheelchairs for accessibility, the use of a “universal design assessment sheet” for each type of disabilities will clarify the needs of improvement for accommodations in the relevant facilities. This will enable corporate executives and facility managers to assess buildings by comprehensive evaluation of the expected asset (market) value of universal design-compliant buildings and the needs for accommodations in each facility. This assessment method can be used not only as guidelines for new construction planning but as a tool when assessing existing buildings. Accordingly, it can be applied to alteration, lease, and purchase of office buildings.

**10. Conclusion**

This report is part of ongoing research by the Workplace Universal Design Study Team of the Japan Facility Management Promotion Association. Henceforth, research will focus on such fact-findings as benchmarking and interviews with enterprises, based on which we will develop guidelines for introducing universal design to the workplace (offices) and assessment tools. Through this research, we sense that the concept of universal design will equally benefit for both corporate executives and facility users (workers). We strongly hope that this study can contribute to corporate management in future as well as to work environments where diverse workers, including elderly people and those with disabilities, can enjoy gainful work.

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