

Post-Occupancy Evaluation of New Office Tower in Nagoya, Japan The Significance of Environmental Behavior Studies

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ABSTRACT

JR Central Towers, designed jointly by Sakakura Associates, Japan, and Kohn Pedersen Fox Associates, U.S.A., and situated in the heart of Nagoya City above the JR-Tokai Nagoya Station, was fully opened in May 2000. The development consists of a hotel, a department store, and office space. The research team focused on non-territorial officing in one of the tenant layouts in the office tower. The workspace that was analyzed is that of a branch office of the large furniture manufacturer, Kokuyo. Findings on workplace performance in this office were then compared against that of another example in the same building. The paper will analyze characteristics of the specific workplace environmental placemaking methodology by focusing on the relationship between functional diversity and innovative staffing typologies. Results of the study illustrate aspects of spatial appropriation and utilization, cross-functional awareness, and workplace collaboration and participation.

Introduction

According to Goldwaith (cited Duffy et al. 1997) function is the most basic tool of analysis in explaining the diversity in workplace planning and design methodologies. Becker (1990) contributes to this debate by describing the complexity in modern office life in terms of its functional diversity. Thereby the goal of the modern office is seen as not to homogenize the office environment, but to allow for functional diversity in work practices and processes through the concept of the office as “*a series of loosely-coupled settings*”. According to Becker (1990) the quality of the office environment is in providing employees with access to those physical resources they need to effectively do their work. This clearly implies the improvement of the

use of office space in order to accommodate increased user-needs and requirements. This has some very important implications for the O-A (Office-Accommodation) relationship in terms of how and where people work. As per analogy to Garreau in “Edge Cities” (1991), the growth and change in modern officing concepts have resulted in workplaces attaining characteristics of fluidity of function and spatial mobility beyond the traditional physical parameters of the organization. The objectives of this paper form part of an ongoing IBPE project by focusing on the effects of the functional diversification of workplace practices and processes on patterns of spatial appropriation and utilization in Japanese workplace environments.

METHODOLOGY

Results presented in this paper were obtained through various investigations in office environments in the above-mentioned location. The location, as well as the various examples, was selected firstly because it is a relatively new development and secondly, because the particular workplace environment which is the focus of this paper, has a very high achievement rate in terms of the NOPA (New Office Promotion Association of Japan) Minimum Standard. The survey was designed and conducted with the specific purpose of identifying and analyzing the effects of new planning and staffing typologies on user-perception of spatial definition and utilization, as well as on aspects of non-territorial working. The research methodology thus aimed at collecting and benchmarking data on environmental behavioral aspects in Japanese workplace environments.

The research process involved a detailed analysis of the Kokuyo office environment through a multi-method approach. The process started with an initial walkthrough of the office in order to familiarize the research team with the general environmental characteristics of the case study example. Data collection consisted of a combination of layout analysis, work-sampling studies, utilization studies of space and time, movement mapping, behavioral mapping, interviews, and questionnaires over a period of three consecutive days. In addition to these, video footage was also taken by means of three video cameras focusing on various functional zones with the office environment.

Utilization studies of space and time were done in 15 minute intervals with a 5 minute break in between. During these studies data was collected through observation and mapping of employees and their utilization of workspace and movement in the office. Data from the video footage were then analyzed and used to add to, and where necessary, adjust data collected through the researchers’ observations. This process of checking and comparing information from various sources increases the reliability of the

results, and enables a better perspective of the complexity of behavioral matters in workplace environmental research. In addition to the general purpose of the methodology to determine spatial appropriation and utilization, the movement mapping was also used to determine general movement lines within the office. During the movement mapping, observations were made on the basis of individual moment characteristics and interpersonal contact between employees. Data on interpersonal contact between employees was also collected on the basis of its accessibility across organizational and hierarchical structures, as well as on the duration and frequency of these contacts. In order to determine the organizational structure, the general work area was divided into a series of nodes and paths. Each node was numbered and the frequency of employees passing through it registered. This enabled the research team to construct an organizational model illustrating the exact hierarchical nature of the workplace environment.

CASE STUDY: DESCRIPTION AND ANALYSIS

Kokuyo: Workplace Planning According to Diversified Staffing Typologies (Example A)

Concepts of workplace-placemaking employed in the overall workplace environment of Example A as discussed here, are a direct translation of both organizational ecology and the translation of functional and enabling technologies into physical form. The internal workplace planning methodology is based on i) spatial requirements of various workplace practices and processes, ii) information and communication technology (ICT), and iii) the classification and formulation of staffing typologies according to work-style diversity. The overall office is divided into a distinct public (front stage) and private (back stage) workplace area. The public area contains functions such as the reception and waiting area, informal meeting/consultation space, formal meeting rooms, and also an audiovisual training/presentation room. The private workplace area contains the general work area and forms the focus of this analysis.

General Workspace Layout

The private domain of the office contains the general workplace area and consists of various activity settings based on an innovative staffing typology that was devised by the company for implementation in its own workplace.

The various activity settings are arranged within an open-plan layout. All activity settings are designed for functional support of location-independent working with no physical divisions between the various activity groups. Collaboration spaces are easily accessible and are intended to enhance cross-functional awareness.

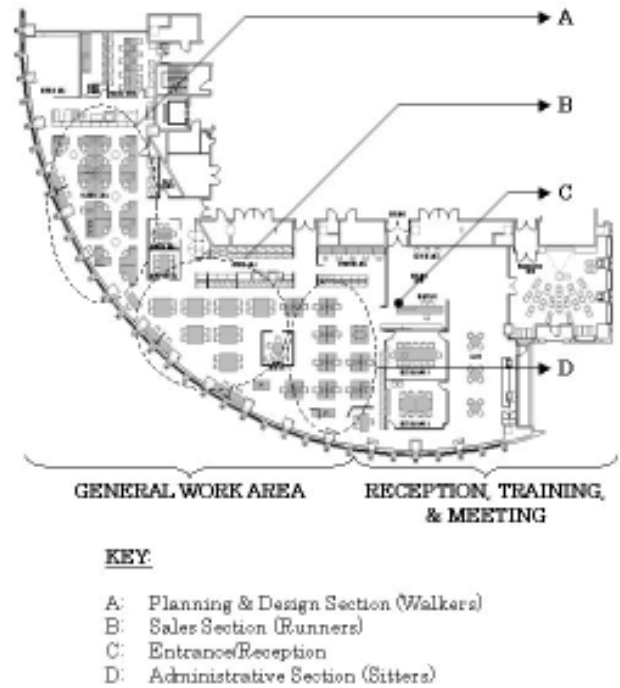


Fig.1 General workplace layout, Example A

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Staffing Typologies

“Sitters”, “walkers” and “runners” are three different staffing typologies that refer to employees with varying work styles within the office. Sitters are mostly administrative personnel who spend all their time in the office and are accommodated through a fixed-address system. Workspace for sitters comprises of a 1600x1600mm table accommodating two employees, each with a 800x1600mm sized desk space.

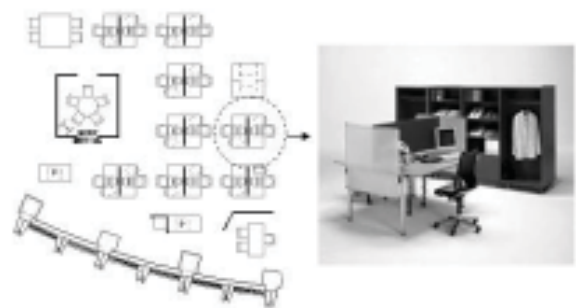


Fig.2 Fixed-address workspaces for sitters in the Administration Section, Example A

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In addition to this, sitters also have individual desk-top telephones and personal computers, chairs with maximum support and arm rests, and a mobile filing cabinet. A partition between the two employees of any one table ensures personal workspace, and provides some degree of visual

screening and opportunity for concentrated work. Mobile filing cabinets contain frequently used information, while records are kept in special filing cabinets in the designated support zones (see Fig.5). All power and data connection points are through the flexible access floor. A wire management system is used to ensure that all cables from the floor to the desktop are neatly organized so as not to create any form of disturbance.

Walkers include staff from the Planning and Design Section and have a higher degree of mobility in the office. The activities of walkers are focused on group work. Employees are accommodated in groups of four and separated from adjacent groups by low partitions. These partitions provide some means of group identity, but do not physically separate the enclosed group space from the rest of the workplace environment.

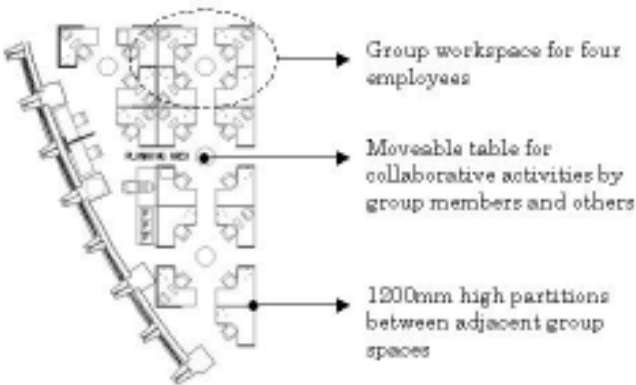


Fig.3 Group workspaces for walkers in the Planning and Design Section, Example A

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Employees from the Sales Section, who spend relatively little time in the office, are categorized as runners. Due to their high level of mobility in the office, they are accommodated through a non-territorial or free-address system. Tables of a similar 1600x1600mm are used to accommodate a maximum of four employees. All connections for power and data are at tabletop level to ensure maximum ease of use and functionality. These connections are set in a row on the center of the table and include four separate data connections and one power connection with four separate outlets. Runners are also completely dependent on mobile (cellular and PHS) communication. Free-address workspaces have chairs without arm rests and mobile filing cabinets which are “parked” underneath individual lockers. Individual lockers are password-protected and provide adequate storage space for laptops, stationary boxes, and frequently used files. Power connections for the recharging of cellular phones and laptops are provided within the lockers.

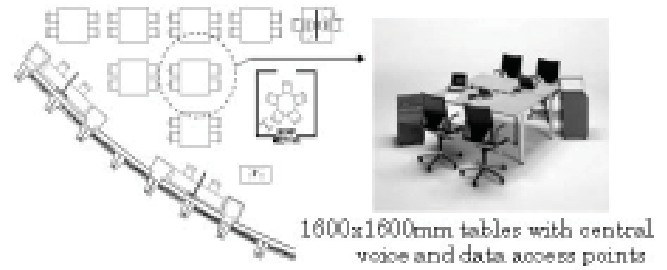


Fig.4 Workspaces for runners in the Sales Section, Example A.

Fig.4 Workspaces for runners in the Sales Section, Example A

Special waist-high counter space with filing and fax facilities have been provided for specific use by runners who spend a very short time in the office in the morning. This space allows for informal communication between runners and other employees while sending and/or receiving faxes.

Support Spaces

Support spaces support the various staffing typologies and contain fax and photocopy facilities. Due to its specific support requirements, the Planning and Design Section has a dedicated support space with additional printing facilities. Collaborative spaces also act as communal nodes within the open-plan layout providing opportunities for both structured and informal collaboration.

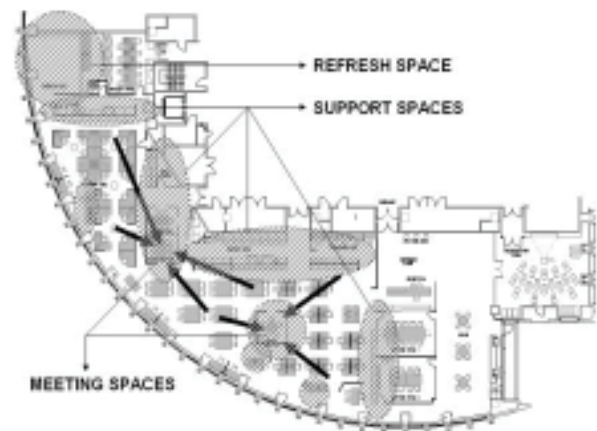


Fig.5 Distribution of support spaces throughout the general work area, Example A

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COMPARATIVE RESULTS AND DISCUSSION

Spatial Appropriation

This analysis focuses on spatial appropriation in the Kokuyo office (Example A), and more specifically on the implications of accommodating the three staffing

typologies. Findings are presented in comparison to a corresponding partial office area of a large chemical group (Example B) in the same building (See Fig. 6).

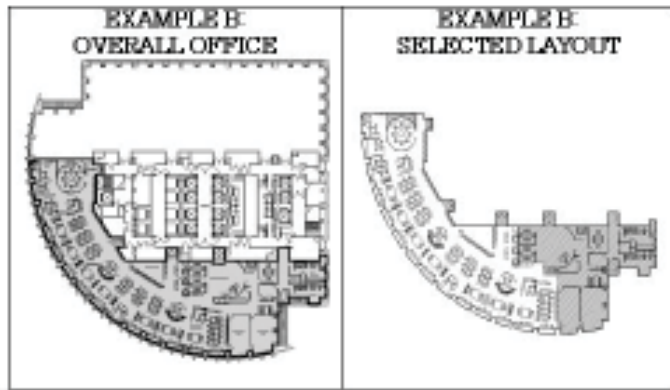


Fig. 6 Partial layout of Example B selected for comparison

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A. Overall office area

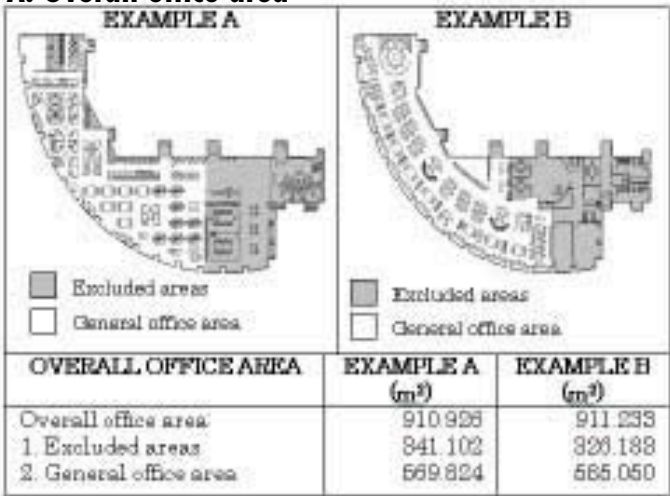


Fig. 7 Comparative analysis of overall office area

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B. General office area

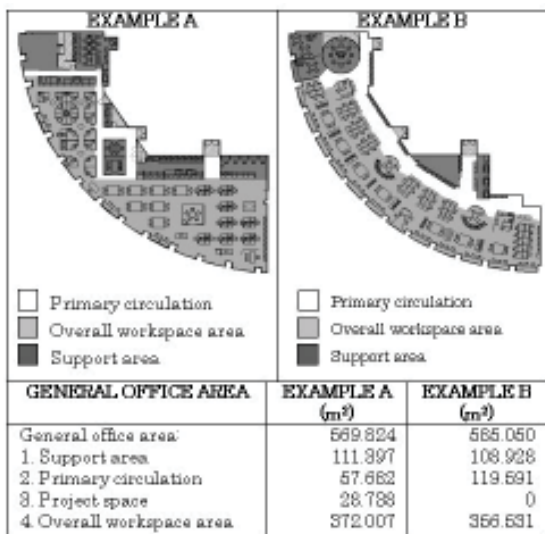


Fig. 8 Comparative analysis of general office area

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The general office area is defined as that part of the office where the actual work area of the organization is accommodated, and excludes the reception and main meeting or boardroom areas. Both of the examples utilize the space nearest the perimeter for an open-plan work area, while the space furthest from the windows are used for support functions such as filing spaces, copy/fax areas, and locker rooms. The analysis of the general office area of the two examples resulted in the following observations:

- i. There is a higher level of functional differentiation of individual workspace layouts in Example A. This contrasts with the high level of standardization of activity settings in Example B, and can be attributed to the workplace planning methodology of Example A being based on the classification of its employees as sitters, walkers, or runners. This directly affects the O-A relationship in terms of the appropriation, utilization and management of spatial resources
- ii. The office layout of Example A also allows for special groups or project teams to be co-located in a defined project space. This facility is completely lacking in Example B. The presence of a special space to accommodate group-based collaborative activities is proof of the managerial structure's recognition of the relevance of collaboration and team support, as well as functional diversity of office tasks
- iii. The most noticeable difference between the two examples is that of primary circulation. In the case of Example B, a well-defined primary circulation axis facilitates movement through the office by preventing unnecessary movement through the actual open-plan workspace area. In Example A there is no primary circulation axis, and all movement is directed through the actual workspace area of the Sales Section (runners)

C. General support area

General support areas are defined as those support areas within the general office area that support the office as a whole. These include informal meeting areas, refresh spaces, locker rooms, and filing spaces.

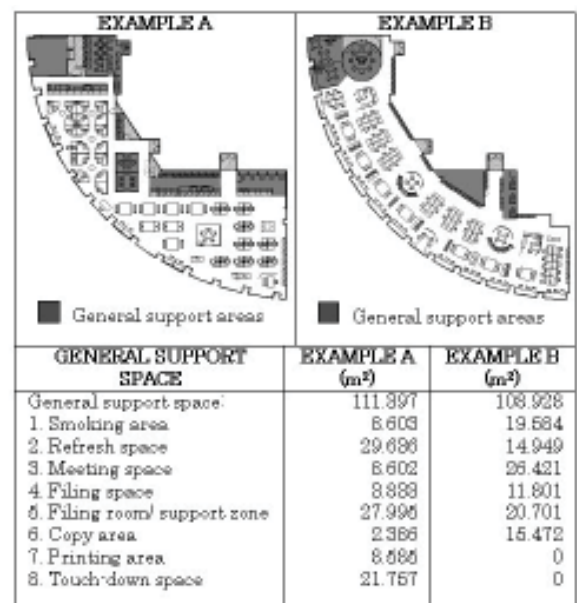


Fig. 9 Comparative analysis of general support space

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C. Overall workspace area

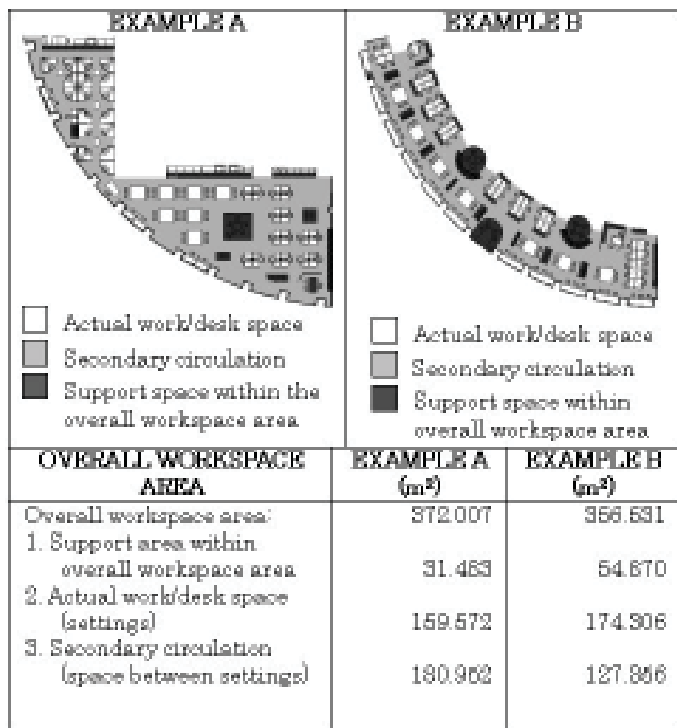


Fig.10 Comparative analysis of overall workspace area

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The overall workspace area is defined as that part of the general office area less all general support spaces. The analysis of the overall workspace area of the two examples resulted in the following observations:

- Meeting spaces within the overall workspace area of Example B have a greater prominence than in Example A. Meeting spaces in Example B are located within the workspace area and in close functional proximity to both individual activity settings and support areas. The meeting areas also have low (1200mm high) partitions which enables employees using them, to maintain visual contact with the rest of the office. Their effectiveness can be attributed to their direct proximity to copy/fax areas and the primary circulation axis which function as activity magnets by increasing the probability of informal contact between employees
- The arrangement of furniture within the overall workspace area of Example B appears to be more suitable to secondary movement in between the various activity settings than in the office environment of Example A.

D. Support space within the overall workspace area

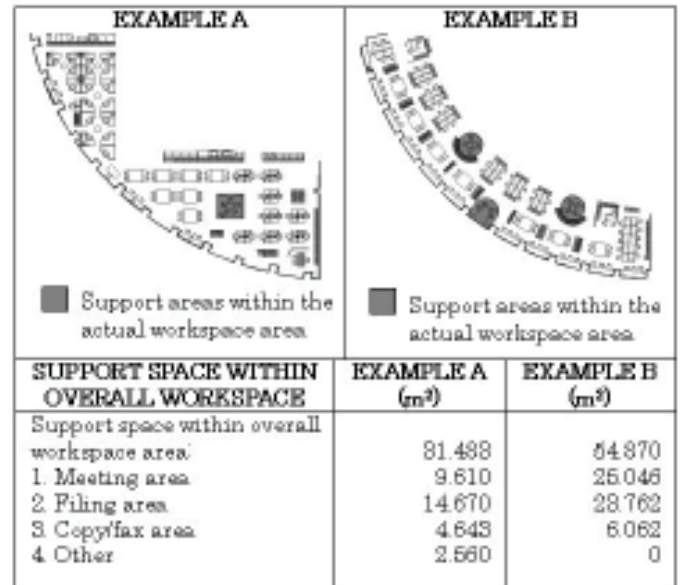


Fig.11 Comparative analysis of support space within the overall workspace area

Fig.11 Comparative analysis of support space within the overall workspace area

Support spaces in the overall workspace area are classified as secondary support space and include, in addition to the main support spaces and zones, additional meeting areas, filing cabinets, and copy/fax areas. Secondary support spaces in Example B were found to be far more in number and diversity than in Example A, and were also in closer proximity to workspace settings. As such, secondary support spaces in Example B appear to be more effective in facilitating cross-functional awareness and informal contact

F. Comparison of individual floor space standards

STANDARD	EXAMPLE A		EXAMPLE B	
Maximum number of activity settings	76 settings		99 settings	
INDIVIDUAL STANDARD	Total (m ²)	m ² /per person	Total (m ²)	m ² /per person
Space per individual setting based on:				
1. overall office area	910.98	11.99	911.23	9.20
2. general office area	569.62	7.50	585.05	5.91
3. overall workspace area (inclusive of all secondary movement and support areas)	372.00	4.90	356.63	3.60
4. overall support space	142.68	1.88	163.80	1.66
5. overall circulation	238.63	3.11	246.95	2.49
6. secondary circulation	180.96	2.38	127.86	1.29

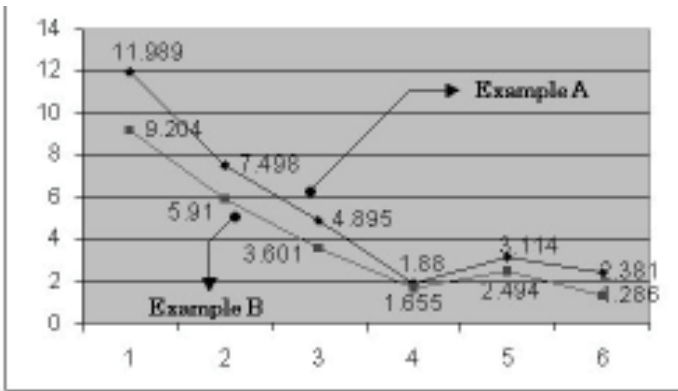


Fig. 12 Comparative analysis of individual floor space standards

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The results of the analysis of overall individual floor space standards in the two examples show that the level of spatial appropriation per employee in Example A is much higher than in Example B. This is mainly due to fewer workspace settings. Individual spatial appropriation in Example A, expressed as part of the overall office (11.989m²) and the general office area (7.498m²), is well above the recommended NOPA Minimum Standard of 6m² per person. In comparison, similar standards in Example B are 9.204m² and 5.910m² respectively, which is closer to the above-mentioned NOPA Minimum Standard.

Movement Study

Movement studies are important for two reasons: firstly, because it reveals the patterns of functional movement involved in work processes and practices in the office, and secondly, because it quantifies communication and collaboration in the office. As such, movement studies give a true reflection of the organizational character through the structuring of personal contact across departmental and hierarchical barriers. An analysis of the movement study in Example A showed that free movement and communication was possible for all employees. Since the constraints of organizational hierarchy were intentionally avoided in the planning and design of the new workplace environment, it was possible for all employees to have direct contact with management across all departmental, functional, and managerial parameters.

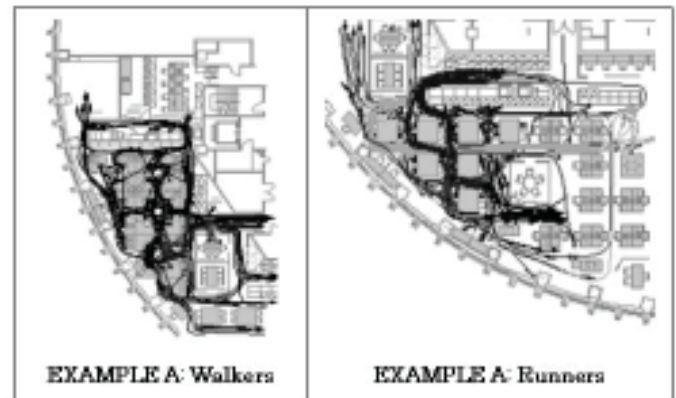


Fig. 13 Analysis of movement patterns within the workplace environment of Example A

Fig. 13 Analysis of movement patterns within the workplace environment of Example A

CONCLUSION

The results of the study have shown how perceiving the workplace environment holistically as a system of interrelated parts, or loosely couple settings as per Becker (1990), rather than a compartmentalized homogenous space for work, can improve overall workplace effectiveness. The results also provided information for a wider basis of comparison and discussion and subsequent benchmarking of spatial standards and mobility in Japanese offices. This study highlights the increasing importance of the concepts of mobility, location-independent working through enabling ICT, and general workplace identity and legibility for all types of employees in the office. The concept of mobility allows office work to become a series of movements that create change encounters and informal meetings that are comparatively more productive due to the fact that they are spontaneous and unplanned. Planning and design methodologies include a mixture of private, static, and dynamic workspace settings. This level of spatial diversity makes it possible for employees to freely choose their work settings according to the nature of their work. Mobility thus allows employees to move to and between public, private, and shared spaces in the general office area.

Results of this study have a wide range of applicability. However, its greatest value lies in the implications for workplace planning by making office space more efficient and more effective. The improvement of workplace efficiency focuses on a wide range of topics such as the design of the office shell, space planning techniques, furniture standards and fit-out to minimize churn, space-use intensification, and energy conservation. Surveys of time and space-use patterns in the workplace show a lower level of workspace occupancy than what is generally assumed.

Workspaces tend to be empty or unoccupied for parts of a working day as users and user-groups engage in activities either elsewhere in the office, or outside the office. With ICT-infrastructures becoming a more dominant part of overall workplace technologies, time-sharing of workspaces is simultaneously becoming a more appropriate method of improving both time and space utilization efficiency in the workplace. Improvements in workplace effectiveness however, are less quantifiable than those in workplace efficiency, and depends mainly on the organization's ability to use the opportunities provided through improvements in workplace efficiency to its full advantage. Improving effectiveness not only depends on making resources available to staff, but also on more complex organizational aspects such as training, leadership, and general organizational culture. Making the workplace environment more effective can be achieved through the provision of more support spaces, a wider range of workspace settings, and workplace environments that stimulate cross-functional collaboration and a general sense of participation in organizational matters.

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