

A Study on the Spatial Characteristics of Smart Work Centers in Korea

Sanghoe Koo and Hyunhee Lee

Professor, School of Business and Administration, Korea University at Sejong Campus, Sejong, Korea
Professor, Department of Architecture, Gachon University, Sunghnam, Korea

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Abstract Smart Work is a way of working independent of time and space restrictions with the help of ICT. For past years, Korea has been promoting Smart Work to boost ICT industry, to overcome low birth rate and population ageing, and to implement Smart Korea. Three elements of Smart Work include people, technology and space. A lot of research has been performed on people and technology for Smart Work. But it is hard to find research on space. In this paper, some representative smart work centers(SWCs) in Korea were selected and analyzed from the perspective of spatial design including general characteristics, personal spaces, group spaces, and support spaces. From this research, it is observed that current SWCs in Korea are good in providing personal work spaces and simple group meeting rooms as well as ICT environments. However, they lack of openness to the public and group spaces to encourage informal communications. It is also observed that personal space plans need to be multi-functional, and that novel supporting spaces are required to improve quality of life and creativity of workers.

Keywords: Smart Work, Work Smart, Smart Work Center, Spatial Design

1. INTRODUCTION

Smart Work is a way of working independent of time and space restrictions with the help of recent advances in ICT (information and communication technologies) (Jungwoo Lee, etc., 2013). In Smart Work environments, individual workers may perform their tasks without any constraints on when or where. Smart Work includes telecommuting which means they work at their own residence, mobile office which means they work at any time any place using apps installed in their mobile devices such as smart phones or tablet PCs, and smart work center works which means they work in any smart work centers located nearby [Figure 1].

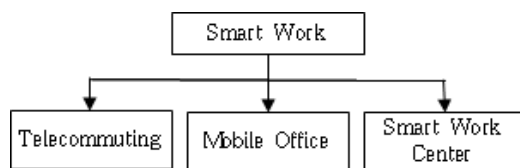


Figure 1. Types of Smart Work

Corresponding Author: Hyunhee Lee, Professor
Department of Architecture, Gachon University, Sunghnam, Korea
Tel: +82-31-750-5411 e-mail: hhlee@gachon.ac.kr

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Since Smart Work removes restrictions on working time and spaces, it provides work opportunities to the people who have difficulties in moving namely pregnant women, disabled persons or elderly people, and it improves productivities by allowing people to work even when they move in locations. In addition, Smart Work decreases carbon dioxide emission by reducing the number of business travels.

Smart Work is also considered as an innovative way to implement Work Smart. Work Smart, contrary to Work Hard, is a way of working smart by performing their tasks more productively, cleverly and creatively in order to balance between work and life, improving quality of life (Hyunkook Cho, etc., 2011). Strategies to Work Smart include spatial management, time management and task management[Figure 2]. Spatial management involves making work space smarter by utilizing smart offices, mobile offices and telecommuting, making work space more flexible and non-authoritative by employing flexible seating in which seats are not assigned to specific persons or positions, and making work space more private and more communicative for focused works and work communications. Time management involves flexible time in which workers choose when to go to and come from work

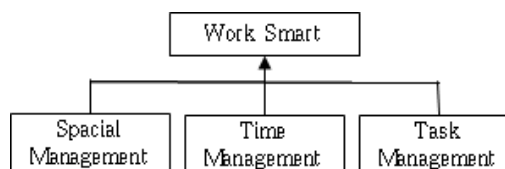


Figure 2. Work Smart Strategies

places and block time in which every worker focuses on his/her own work without being interrupted, which in turn makes workers control stress by managing time at their own convenience. Task management involves making individual workers' mission clearer by building detailed roadmap, etc., making business processes improve or innovate by utilizing SNS or collective intelligence, making business meetings more creative and productive by changing meeting culture, and making performance evaluation more accurate by employing more objective and tangible performance evaluation systems (Min He Lee, 2011).

Smart Work is considered as an emerging solution for the global low birth rate, population ageing, low labor productivity, and wealth polarization. According to EIU (Economist Intelligence Unit), Korean IT Industry Competitiveness ranked 16th in the world in 2009, which was 8th in 2008 (Committee of National Informatization Strategies, 2010). To overcome such sharp drop, Korea promoted Smart Work to build turning point for ICT industry boost and to implement Smart Korea. However, the smart work centers currently under operation in Korea do not operate successfully nor prosper as expected. But the reasons are not clearly revealed.

The main reason seems that Smart Work related research focusses mainly on ICT, not on spatial designs of smart work centers. Consequently, most of smart work centers look exactly like traditional offices equipped with high end ICT devices, and some centers even seem like luxurious Internet Cafe (PC-bang in Korea), which doubtfully implement desirable smart work centers. To meet dynamically changing social needs and to successfully implement Smart Korea, a systematic and comprehensive research on Smart Work needs to be done especially from the perspective of spatial design.

1.1 Purpose of Research

In this research, some of representative SWC cases in Korea are selected and analyzed from the perspective of spatial design elements. The purpose of the research is to discover design characteristics of such cases and to suggest guidelines for improvements.

Out of three types of Smart Work, telecommuting and mobile offices do not require any additional spatial designs. Just the SWCs require designing new work spaces for various types of workers to work in. Therefore, this research is restricted to SWCs. In this research, we do not address a lot about SWCs from social, behavioral or technical perspectives since such research has been performed a lot in the field of Smart Work and Work Smart.

2. BACKGROUND RESEARCH

In this chapter, we review birth, growth, concept, and trends of Smart Work and its research, then discuss the necessity of the research about spatial design of SWCs.

The concept of Smart Work started to appear around 1990s in United States and its discussion in Korea started late 2000s (Committee of National Informatization Strategies, 2010). Smart Work is defined as 'Performing work collaboratively with any one at any time any place using ICT including the

Internet.' Traditionally, Smart Work includes three types, namely telecommuting, mobile office and smart work centers. Recently, they added smart offices in which they add top of the line ICT devices and Work Smart concepts to current offices, which in turn improves work collaboration, concentration, flexibilities, performance, and so on.

According to a report of Microsoft on Smart Work (Microsoft, 2011), the key elements of smart work include people, technology and space. In the element of people, it is important to improve the quality of life as well as productivity and creativity of workers, and in the element of technology, it is significant to enhance productivity and collaboration of workers using ICT. In the element of space, it is crucial for them to work comfortably and effectively in any SWCs nearby as in their own offices.

Two main streams of Smart Work research include humanities and social research and engineering and technical research (Kwang-Hyun Im, 2010). The main object of humanities and social research is human, and that of engineering and technical research is ICT. The brief review of such research is as follows.

According to Im (2010), main objectives of research of humanities and social research are to develop policies regarding Smart Work.

Types of research include social and behavioral theory development about Smart Work, effects, pros and cons analysis of Smart Work, global and domestic current status of Smart Work survey, and policy suggestions on Smart Work, and so on. To sum up the results of those researches, Smart Work improves work productivity, increase work opportunities, and helps reduction of carbon dioxide emissions. However, workers tend to have feeling of social isolation due to the lack of facial contacts, workers tend to lose home stability due to the breach of boundaries between homes and work places, and workers may lose trust from superiors due to the lack of visibility. To successfully implement Smart Work, it is required to prepare laws, policies and action plans to overcome such difficulties.

On the other hand, in engineering and technical research, they concentrate on basic and application technologies involving Smart Work, and policy development to promote such technical development (Kwang-Hyun Im, 2010). Key technical Smart Work elements include SNS, collaboration, mobile computing, cloud computing, big data, and so on. SNS and collaboration allow workers to share knowledge and experiences and to work together with any one, mobile computing allows for workers perform their tasks at any time and any place, cloud computing allows workers to perform their works with any devices connected to the Internet. Big data allows workers to make decisions more accurately with the help of a vast amount of data (SeungByung Chae, et., 2012).

In 2005, Kowalski and Swanson (2005) suggest support, communication, trust, security as key success factors for Smart Works. According to them, for support's sake, it is required to build more SWCs, to increase manager's trust in workers, to develop proper technologies, and to implement legal and institutional frameworks. For communication's sake, it is necessary to utilize Web 2.0 technologies for distant meeting and knowledge sharing such as telepresence, SNS, wiki, blogs, etc. For trust's sake, it is necessary to develop objective and accurate evaluation systems and security technologies.

As reviewed above, architectural or spatial researches are hard to find in the literatures. However, researches on all three elements, namely human, technology and space, are necessary for successful Smart Works. Therefore, it is meaningful to study spatial designs of currently operating SWCs in Korea.

2.1 Survey and Approach

SWCs are remotely located from their own offices. However, it is still important to perform their works and collaboration among themselves effectively and efficiently. Accordingly, following the previous research of Im (Im, 2011), SWCs are analyzed from three perspectives of personal spaces, group spaces and supporting spaces. Especially for the analysis of group space, the characteristics of SWCs are analyzed according to the classification of Nicolas (Nicolas et. al., 1999). Nicolas classified collaborations into four types, that is, synchronous and co-located collaboration, synchronous and remote collaboration, asynchronous co-located collaboration, and asynchronous and remote collaboration [Figure 3].

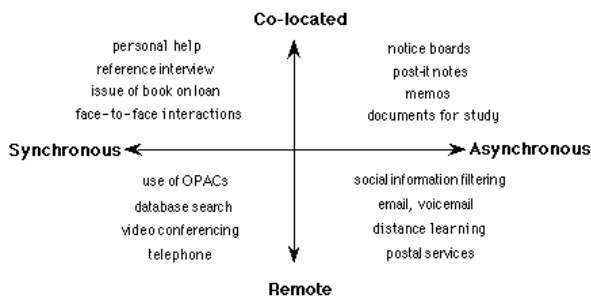


Figure 3. Collaboration quadrants (Nicolas et. Al., 1999)

3. CASE STUDIES

3.1 Case Selections

In Korea, MOSPA (Ministry of Security and Public Administration) started to promote Smart Work in 2010 targeting

500 SWCs built in Korea by 2015 (50 governmental and 450 private). Currently MOSPA is running 15 SWCs in Dobong, Bundang, Bucheon, and so on (smartwork.go.kr). In private sectors, Samsung Electronics (samsung.com/sec) is running mobile offices to overcome time and space constraints, KT is running SWCs to innovate business processes, Yuhan-kimberly (yuhan-kimberly.co.kr) and Daewoong (daewoong.co.kr) which have more female employees than other companies promote telecommuting for those who are doing child birth and care. Hyundai Mobis (mobis.co.kr) are using telepresence for meeting among global branches, and Posco (posco.co.kr) is developing 'smart factory' operating on smart phones. Many medium size companies as well as large companies are working on Smart Work in Korea.

As mentioned in chapter 1, the research focus was made on spatial elements of SWCs. Out of many SWCs in Korea, KT, MOSPA and K-water SWCs are chosen for survey that are very active in employing Smart Work. The selected SWCs include four KT running centers (C1~C4), two MOSPA running centers (C5, C6), and one K-water running center (C7).

3.2 Overview of Smart Work Centers under Survey

1) KT Smart Work Center in Bundang (C1)

We call the representative KT smart work center in KT head office C1. There are eight SWCs opened in 2010 in KT head office. C1 is a very stereotypical SWC having booths for individual workers, quiet rooms for focused works, video conferencing rooms for distant meeting, and general meeting rooms. C1 has 'honeycomb style' work spaces which are very flexible and useful for various types of workers. C1 is located at the first floor of the KT head office in Bundang. Only the internal employees may reserve seats on line in advance. Utilization is usually low during early weeks and early months but it is high on Thursdays, which reflects the style of works in KT. At first overall utilization was low, so they started to rent 8 seats for outsiders starting from December 2011. C1 also has support spaces such as tea rooms, locker rooms, copy-and-print rooms, an information desk, rest rooms, and a fitness center.

Table 1. Smart Work Centers under Survey

Codes	C1	C2	C3	C4	C5	C6	C7
	KT Bundang-1	KT Bundang-2	KT Mokdong-1	KT Mokdong-2	MOSPA Jamsil-1	MOSPA Jamsil-2	K-water
Operator	Private (internal use + rentals)	Private (rentals)	Private (rentals)	Private (internal use)	Government (rentals)	Government (internal use)	Government (internal use)
Location	Jeongja, Bundang	Jeongja, Bundang	Modong, Seoul	Modong, Seoul	Jamsil, Seoul	Jamsil, Seoul	Daeduk, Daejeon
When Opened	2010.11	2011.8	2011.6	2011.6	2011.12	2011.12	2011.
Size	19 booths	40 seats	34 seats	12 seats	5 seats	20 seats	6 seats
Video conferencing	1 room	-	1 room	(1 room)	-	1 room	-
Meeting room	2 rooms	-	9 rooms	-	-	1 room	-
Other spaces	2 quiet room	-	Cafe	-	-	-	resting area
Usage	Online Reservation	Rentals	Long term Rentals	Online Reservation	Online Reservation	Online Reservation	Business trips & training purpose

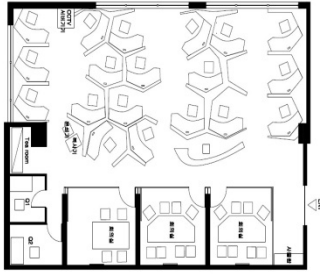


Figure 4. Layout of C1

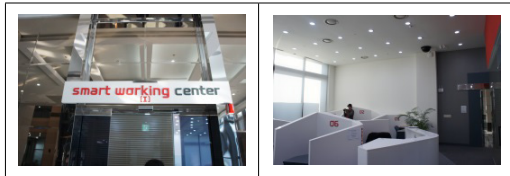


Figure 5. C1 in KT head office (Main entrance and honeycomb seats)

2) KT Smart Working Center in Bundang (C2)

We call another SWC in KT head office C2. C2 is a second grade SWC which is one of the eight centers opened in 2011. Spaces are separated for individual workers using partitions forming honeycombs of square seats, which are very common, and there are no supporting spaces. Workers may use resting areas and fitness facilities in KT head office. C2 can be used by both internal and external persons. External users may reserve spaces on daily or monthly bases.

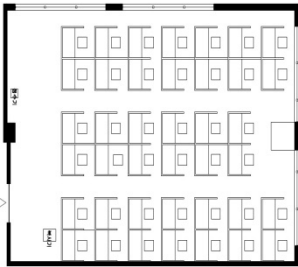


Figure 6. Layout of C2

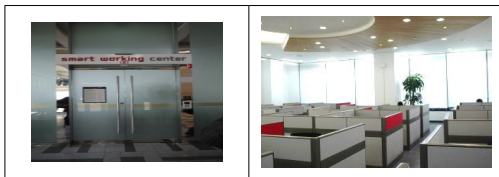


Figure 7. C2 facilities (entrance and seats)

3) KT Smart Working Center in Mokdong (C3, C4)

There are two SWCs in KT Mokdong Office which opened in June 2011. One is open to anyone, and the other is open to internal members only. We call the first one C3, and the second one C4. C3 and C4 occupy whole area of 20th floor of KT Mokdong Building, and is called “KT olleh Smart Working Center”. There are 36 ICT and contents related companies leasing the center in C3. C3 has many small sized offices, and a few shared seminar rooms, meeting

rooms, video-conferencing rooms, resting area, and so on. Renters pass security gates on the first floor using RFID cards. In the elevator, a large screen informs that the SWCs are located on the 20th floor, and individual offices have their own photo boxes.

Renters can use cafeteria and restaurants in the basement. C4 is open only to internal members. It is small in size compared with C3, but has three meeting rooms and one video-conferencing room.



Figure 8. Layouts of C3 (honeycomb style) and C4 (booth types)

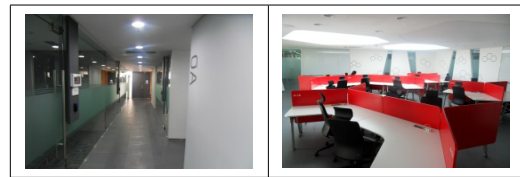


Figure 9. C3 facilities (entrance and internal view)



Figure 10. C4 facilities (entrance and internal view)

4) MOSPA Smart Work Centers in Jamsil (C5, C6)

We call MOSPA smart work centers in Jamsil C5 and C6. The center were built during the third project for MOSPA's developing SWCs. The center is located on the second floor of postal office in Jamsil that will be used by the public officials in Gangdong, Gangnam, Hanam and Guri. The area of the center is 231m². The center has two separate spaces, C5 and C6. C6 has 20 seats that are used by public officials and C5 has 5 seats that are used by people from public subsidiary companies. Non-public officials may not use the facility. Entitled persons may reserve the place online and enter the facility with ID cards and GPKI(Government Public Key Infrastructure) certificate.

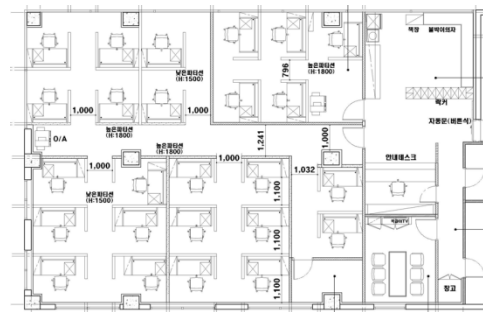


Figure 11. Layouts of C5 and C6

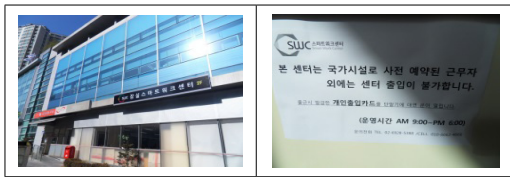


Figure 12. C4 facilities (entrance and internal view)

5) K-water Smart Work Center (C7)

We call the SWC in K-water head office in Daejeon, C7. The center is being used by K-water employees on business trips or training programs. K-water set up smart work promotion plan in March 2012, and built 11 centers with 39 seats across Korea as of December 2012. Four centers in Daejeon head office, Daejeon training center, Guachon office and Chonnam office were built in the beginning of the promotion plan which are equipped with high quality video-conferencing rooms. Recently the center in Guachon office is determined to close due to the low utilization. K-water is a subsidiary organization to MOSPA. K-water has more business trips than any other organizations, and most of their works are very data and ICT intensive. Their objective is to improve work performance by providing similar work environments to travelers' own offices and to increase connectivity to data and applications in the main systems of K-water. In addition, they want tele-training more realistic using the SWCs, and employees expressed high satisfaction.

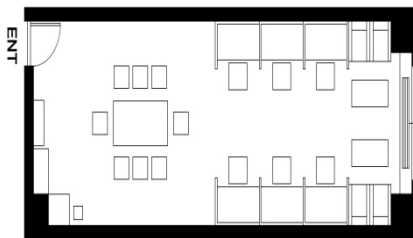


Figure 13. Layouts of C7



Figure 14. Figure 14 C3 facilities (entrance and internal view)

4. SPATIAL CHARACTERISTICS OF SMART WORK CENTERS UNDER SURVEY

It is important for smart work centers to provide friendly working environments to individual workers. For this purpose, it is necessary to look at the characteristics of SWCs systematically. In this chapter, spatial characteristics of SWCs are analyzed from general views, personal spaces, group spaces, and supporting spaces.

4.1. General Characteristics

According to Table 3, C1 provides same spaces for both KT employee and outside members. Except for C1, all other SWCs provide separate spaces for employees and non-employees of KT. MOSPA SWCs C5 and C6 do not allow non-public officials to use them, and provide separate spaces for their own employees and others from subsidiary organizations including CFPB(Consumer Financial Protection Bureau), NIPA(National IT Industry Promotion Agency), KLID(Korea Local Information R&D Institute), etc. Even C1 wanted initially to provide separate spaces for internal and outside members, but failed due to low utilization.

In terms of locations, there are two strategies, off-premise strategy and on-premise strategy. Following off-premise strategy, they build SWCs near to employees' residence area. On the other hand, following on-premise strategy, they build SWCs in the head or branch buildings. According to the survey, C5 and C6 were built following off-premise strategy, and all others were built following on-premise strategy.

In terms of ICT, all SWCs provide proper environments. Most of them provide high-speed Internet access and good environments for mobile devices such as smart phones and tablet PCs. They provide spaces for both focused works and communicative works such as video conferencing rooms. C7 is the only one that allows SWC users to have access to their mainframe computers, but all others have to use cloud computing for their works.

4.2. Characteristics of Personal Spaces

According to Table 2, number of seats in SWCs ranges from five (27.5m², C5) to forty (198.4m², C2). Area per person ranges from 4.36m² to 11.2m², and area of each seat ranges from 2.4m² to 3.23m², with average of 2.73m². Each seat is separated by low partitions, and has a pair of table and chair. Their sizes vary a lot. Printers are shared. C1, C3, C4 and C6 have video conferencing rooms, but C2 and C5 do not have even simple meeting rooms.

In terms of spatial characteristics, C1 and C3 are well planned and built in terms of design and refinedness. Dominant colors are white and grey and emphasis color is red, which gives the image of high-tech offices. A variety of desk types and partition heights give modern and clean atmosphere. C2 and C4 have simplified and diminished seats and monotone colors, which gives stable atmosphere. C5 and C6 have comparatively high wood-glass partitions, dark-grey carpets, lime white color walls and ceiling, which gives clean and stable atmosphere. In terms of C7, tables are placed against walls, and colors are not selected with some intentions, which give poorly organized atmosphere. All the tables have electrical outlets for laptops, and C6 and C7 even have telephones.

To make general comments, the SWCs under survey are well equipped with the Internet and ICT devices. But in terms of design and refinedness, they vary a lot from SWCs to SWCs. It seems that they consider it more important to guarantee personal space and equipment rather than good spatial plan and design.

These days work spaces tend to be multi-functional hybrid space in which they rest, chat, meet, play, work, etc., at the same place. SWCs under survey do not reflect such spatial trends (Changing Place, Media Lab, MIT).

4.3. Characteristics of Group Spaces



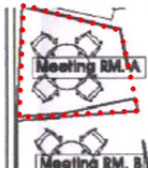
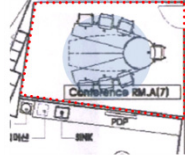

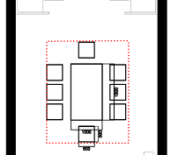
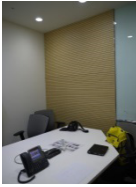
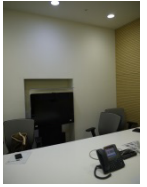
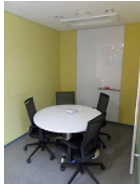

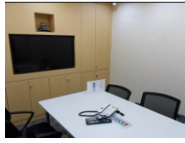
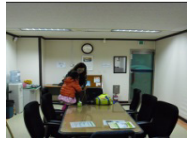
According to Table 3, C1, C3/C4 have both general meeting rooms and video conferencing rooms that allow both internal and distant meetings and collaborations. C3 and C4 need reservation for use, and C3 requires fees for use in some cases. C6 which is small in size has a room for both general meeting and video conferencing. C7 has table and chairs near to the entrance for meetings. However, C2 which is for rentals and C5 which is small

in size have any group spaces. In terms of group space usage, C1 and C3/C4 which are built in telecommunication companies have separate general meeting and video conferencing rooms, whose utilization is also high. C6 has only one room for both general meeting and video conferencing. The room is usually used for facial meeting not for tele-conferencing. On the other hand, C7 does not have any group space. But C7 users use individual PCs and head sets for tele communications and tele training.

Table 2. general Characteristics and Comparisons of Personal spaces

Codes	C1	C2	C3	C4	C5	C6	C7
Area	199.7m ²	198.4m ²	169.1m ²	52.3m ²	27.6m ²	132.6m ²	67.2m ²
Seats	19 (internal use + rentals)	40 (rentals)	34 (rentals)	12 (internal use)	5 (public officials)	20 (public officials)	6 (public officials)
Area per seat	10.5m ²	4.96m ²	4.97m ²	4.36m ²	5.52m ²	6.63m ²	11.2m ²
Color plan	white/dark grey red	white/grey	white/black/red	white/grey	white/grey/beige	white/grey/beige	N/A
Personal Space Plan							
	2.7m ²	2.52m ²	2.8m ²	2.25m ²	3.23m ²	3.23m ²	2.4m ²
Overall Views							
Personal Space Views							
Facilities	1 video conference rm, 2 meeting rm, 2 quiet rooms	None	1 video conference rm, 3 meeting rm, (internal use + rentals)	1 video conference rm, 3 meeting rm, (internal use + rentals)	None	1 video conference room	Resting area
Personal Equipment	1800×700 desk (variable) 2 electric outlet 1 LAN slot	1400×700 desk 2 electric outlet 1 LAN slot	1800×700 desk (bending type) 2 electric outlet 2 LAN slots	1400×650 desk 2 electric outlet 2 LAN slots	1700×1000 desk interphone 2 electric outlet	1700×1000 desk interphone 2 electric outlet	1400×800 desk 4 electric outlet desktop headset interphone
layout	1700×1700×h: 1500h honeycombs of pentagonal or hexagonal desks - individual booths types	1400×1800 ×h:1200 array of same sized desks - partitions	1700×1700×h: 1500 honeycombs of pentagonal or hexagonal desks -partitions	1400×650×h: 1500array of same sized desks separate for internal and outer use	1700×1000×h: 1200 array of same sized desks non-public officials' use	1700×1000×h: 1200 array of same sized desks public officials use	1400×1000×h:800 -partitions
Shared devices	printers and copying machines	printers	printers	printers	printers	printers	printer installed on just one seat

Table 3. Comparisons of Group Space

Codes	C1	C1	C3/C4*	C3/C4*	C6	C7
	2 meeting rooms	1 video conferencing rm	3 meeting rooms	1 video conferencing rm	1 video conferencing rm	meeting corner
Layout						
Images						
Equipment	Desk, chair, white board, large monitor, telephone, 2 electric outlets	Desk, chair, large monitor, telephone, 2 electric outlets	Desk, chair, 2 electric outlets, 1 LAN slot	Desk, chair, teleconferencing system, 2 electric outlets, 1 LAN slot	Desk, chair, LED TV	Desk, chair

(C3/C4* are shared by internal and external members)

C7 has table and chairs near to the entrance for meetings. However, C2 which is for rentals and C5 which is small in size have any group spaces. In terms of group space usage, C1 and C3/C4 which are built by telecommunication companies have separate general meeting and video conferencing rooms, whose utilization is also high. C6 has only one room for both general meeting and video conferencing. The room is usually used for facial meeting not for tele-conferencing. On the other hand, C7 does not have any group space. But C7 users use individual PCs and head sets for tele communications and tele training.

To sum up, group spaces are used for general meeting and tele conferencing. Five out of seven SWCs provide group spaces; three out of the five provide tele conferencing facilities for distant meeting. It is common that outside members do not have access to group spaces for meetings.

According to a research, they exchange more information during informal contacts than during formal meeting in business environments (Hyunkook Cho, 2011). It is hard for SWCs to reflect such observation. But it is the right time to start considering such points for SWC design for the future.


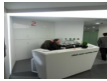







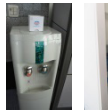



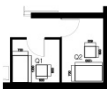

4.4. Characteristics of Supporting Spaces

According to Table 4, in many SWCs, separate supporting spaces are provided such as information desks, locker rooms, resting areas, and restaurants. C7's supporting areas look very similar to those of general offices. C1 provides Quiet Rooms which makes worker be free from any disturbances to focus on his/her own works.

To sum up, most cases provide typical supporting spaces that can be found in general office buildings. Unfortunately, the facilities that may improve productivity, creativity of workers and quality of

life such as cafe, game rooms, massage rooms, nursery rooms, and so on are not provided yet (www.fastcodesign.com).

Table 4. Comparisons of Supporting Spaces

Codes	C1	C2	C3/C4*	C5/C6*	C7
Information					
Lockers					
Rest area	In main office	in main office	in main office		
Dining area					
Others					

C3/C4* C5/C6* : supporting space shared

5. DISCUSSION

As described earlier in Section 2.1, SWCs are surveyed and analyzed from three perspectives of personal spaces, group spaces and supporting spaces, whose result is summarized in Table 5.

According to the table, in most of SWCs, personal spaces are well prepared and provided, but group spaces are not. The richness of supporting space provision varies from SWCs to SWCs. Personal spaces are open type in which multiple users share spaces, and their usage is commonly short term based except for C4 that is monthly based.

Table 5. Summary of SWCs under Survey

Codes	C1	C2	C3	C4	C5	C6	C7
Personal spaces	O M ST	O M ST	O M ST	O M LT	O M ST	O M ST	O M ST
Group spaces	Off On	- -	Off On	Off On	- -	Off On	Off -
Supporting spaces	G	P	A	A	A	A	AP

Personal space O: Open space C: Closed space
 M: Multiple users S: Single user
 LT: Long term use
 Group space ST: Short term use
 On: online collaboration
 Off: offline collaboration
 Support spaces G: Good A: Average P: Poor

The types of collaboration in the SWCs are summarized in Figure 15. According to the figure, C1, C3, C4 and C6 support co-located and synchronous/asynchronous collaboration. But C6 seems barely used for synchronous collaboration. On the other hand, C7 supports synchronous co-located collaboration. C7 is also used for video-on-demand based remote training which can be considered as a kind of remote asynchronous collaboration.

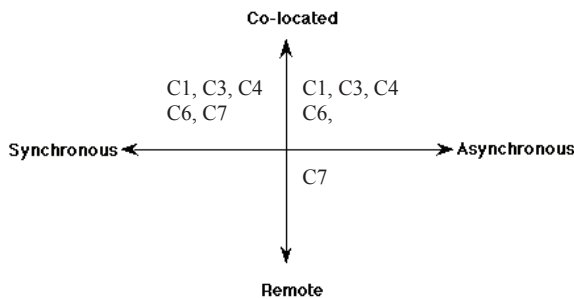


Figure 15. Collaboration types of case SWCs

Observations made from this survey include:

- 1) Most of SWCs under survey are used for business traveling employees. According to 2013 survey, 82.2% of total SWC use was by business travelers.
- 2) Most of SWCs under survey are good in providing personal spaces, but not that good in providing group spaces nor supporting spaces which in turn discouraging online collaboration.
- 3) Even for SWCs supporting online collaboration, they are not active in using collaboration tools such as video conferencing systems.

The purpose of this research is to analyze spatial characteristics of representative smart work centers in Korea. According to the National Informatization White Paper 2013, Korean government added Smart Work Activation Index to the government work

performance evaluation criteria, and plans to increase the number of SWCs from 15 to 50 by 2015. These movements can also be found in private sector (smartwork.go.kr). The results of this research can be utilized for planning types, special composition and operation guidelines of the SWCs to be built.

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