Space Planning and Management: Applying Workplace Complex Concept to Achieve an Optimum Office Space Utilization in Saudi Governmental Workplaces

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تخطيط الفراغ وإدارته: تطبيق مفهوم المجمعات الإدارية لاستثمار أمثل للفراغ المكتبي في أماكن العمل في المباني الإدارية الحكومية في المملكة العربية السعودية

تعتمد المنظمات الإدارية على مواردها المادية وأعيانها لتحقيق أهدافها. ويعتبر الفراغ المكتبي أحد هذه الموارد. إن الاستثمار الأمثل للفراغ المكتبي في المنظمات الإدارية بحيث يساعد على تحقيق أهداف المنظمة قد أصبح جانباً مهماً من مفهوم تخطيط الفراغ وإدارته. كما أن تطبيق الأفكار والمفاهيم المتعلقة باستخدام تقنية المعلومات، وإدارة الترتيبة الفراغية، و تحسين بيئة أماكن العمل ، قد أصبحت جوانب مهمة متعلقة بمفهوم تخطيط الفراغ وإدارته. ونتيجة لزيادة تكلفة فراغات أماكن العمل على عاتق المنظمات الإدارية ، تقترح هذه الورقة العلمية إمكانية تطبيق مفهوم المجمعات الإدارية بين المنظمات الإدارية الحكومية مما يؤدي إلى استثمار الفراغ المكتبي بصورة فعالة أكثر من خلال منح تلك المنظمات فرصة التوسع والانكماش في أماكن العمل حسب الاحتياج المستقبلي لها . كما سيمكنها من إتاحة فرصة مشاركة الفراغ . وقد أظهرت النتائج لسبعة مبان تتبع منظمات إدارية مختلفة ومصممة خصصيا كمكاتب إدارية تابعة للقطاع الحكومي في مكة المكرمة ، وجود معاناة لدى بعض هذه المنظمات الإدارية تتمثل في نقص في الفراغ المكتبي بين مختلف فئات الموظفين ، والذي يعد مؤشراً على اكتظاظ الموظفين . بينما شهدت منظمات أخرى فائضاً فيه ، والذي يعد مؤشرا على هدر هذا المورد وعدم استثماره بالشكل المطلوب . وقد أوضح البحث أنه بالإمكان حل هذه المشكلة من خلال تبني مفهوم مباني المجمعات الإدارية ، حيث ستتمكن المنظمات من التوسع والانكماش في احتياجاتها الفراغية بحرية ، مما يؤدي إلى استثمار أمثل للفراغ المكتبي. وتعرف مباني المجمعات الإدارية بأنها مساقط أفقية منفتحة ومجردة من أي تقسيمات داخلية ومزودة بكامل الخدمات الكهروميكانيكية . وبذلك ستتمكن كل منظمة من عمل الترتيبة الفراغية الخاصة بها حسب احتياجها الفراغي. وقد أوضح البحث أيضاً أنه من خلال تبني هذا المفهوم ، ستتمكن المنظمات من خفض تكلفة الفراغ المكتبي.

ABSTRACT
Organizations depend on their physical facilities and assets to achieve their objectives. Office space is one aspect of these assets. The optimum utilization of office space in organizations in a way that supports their main objectives has become an important issue of space planning and management. The introduction of ideas and concepts regarding the use of Information Technology (IT), managing office layout, and enhancing workplace environments are major issues related to space planning and management. Due to the increased overhead cost of office space on the organizations' budget, this paper suggests that through the introduction of workplace complex concept among Saudi governmental organizations which give them the opportunity of expanding or shrinking office space according to their future demand, office space could be shared effectively, and optimum utilization of office space be ensured. Results out of the adopted seven case studies of Saudi governmental purpose buildings at Makkah revealed that some organizations have suffered from office space shortage of different staff groups. This is an indicator for overcrowding situation, while others witnessed a surplus in their office space causing improper office space utilization. The research showed that through the adoption of workplace complex concept, this problem could be solved, where organizations could expand and shrink freely among each other in their office space, leading to proper office space utilization. Workplace

complex is defined as open plan office space floors devoid of any internal partitions, and equipped with all necessary services and electromechanical utilities. Each organization is supposed to create its own subdivision layouts according to their actual spatial needs. The research has also showed that through the application of workplace complex, massive organizations' saving in their office space budget can be achieved.

INTRODUCTION

Office space has become an important issue for organizations, due to the increased overhead cost. Many organizations in Japan, USA, and Europe seek different strategies to lower their space budget. The need to control office space budget is activated by the economic forces and business trends exerted on organizations, which lead them to adjust their office space accordingly (Brand, 2003).

Space planning and management concerns with the reduction of office space budget through the application of different ideas and concepts. It also concerns with the assurance of the adopted office space policy to support main organization objectives. Organizations have considered space as a valuable asset. Failure in asset management due to the absence of planning policies could lead to organization collapse (Lindo, 2004). Workplace management has become a change management due to change in technology, employees' requirements, organizations' economy and work style (Arend, 2000). Organizations have become aware of the importance of workplaces to adapt easily to change (Nieminen, 2007). The use of Information Technology (IT) in organizations, the introduction of different ideas related to office layout to support productivity, and the implementation of different concepts related to the enhancement of workspace quality are major issues that affect space planning and management.

The use of Information Technology (IT) has great impact on office space reduction. This is mainly due to the introduction of the idea of remote workplaces which abandons the former idea of fixed workplace for each employee. Instead, employees may enjoy the notion of shared facilities including space. An early attempt by Stone & Leuchette introduced the concept of multiple *activity settings*, where the use of IT and the notion of *mobility* among staff has created the concept of *Your office is where you are* (Stone & Leuchette, 1984). Recent approaches in workplace design call for the promotion of shared workstations that could help organizations to maximize their building's floor space. A number of organizations provide unassigned workstations for employees who perform their job as telecommuters (Albin, 2008). IT has also contributed to the reduction of office space due to the reduction in storage space required for piles of papers. Further, IT has enabled employees in some organizations to perform their jobs from home. The introduction of IT has substantiated the need to reconsider office space layout (Pratt, 2006). This is owing to the impact IT has on shaping the physical settings of workplaces. In fact, both organization structure and industry determine the level of tie between staff and main organization's building. Yet, organization still believes in the need to occupy most of its staff in one building. This is due to several reasons, such as the need for staff to witness informal face-to-face encounters and communication, which has direct impact on the level of productivity. The need to create a physical element (i.e. building) that represents the organization is yet another reason.

Space planning and management involves the assessment of spatial quality and features in order to improve the level of staff productivity. Recent approaches have always questioned how future office environments need to be designed to address issues of workers' comfort, productivity and adaptability (Baltimore, 2005). Workplaces design that can inspire employees and nurture creativity and collaboration have become a common trend in smart organizations (Babcock, 2004). The idea of providing multiple workplaces of different spatial layout criteria as well as spatial quality including size, natural lighting and privacy in order to respond to constant change in staff spatial requirements is a another example (Binyaseen, 2005).

Office space layout has become a tool to influence staff productivity through the notion of spatial structure and informal communication. This concept emerged from the established connection between pattern of space and pattern of activities (Hillier, 1984). These concepts are usually applied after launching a comprehensive space audit to assess the mismatch between office space and organization strategies.

This paper focuses on exploring the idea of sharing office space among different organizations in Saudi governmental sectors, which could lead to a massive reduction in office space cost. The idea has been encouraged for the similarity among governmental organizations in both structure and culture, which makes combining different staff that belong to different organizations possible. The need to utilize unused office space is almost neglected in Saudi governmental sectors. The London-based Regus Group's acquisition of computer HQ Global Workplace for $302 million, and the increase in the total leased office space up to 6.6 million square feet (three times), just one year after both companies emerged, has encouraged organizations to reconsider managing their space asset (Chapman, 2004).

OFFICE SPACE SITUATION IN SAUDI GOVERNMENTAL ORGANISATIONS

Many Saudi organizations witness change in man power size due to restructuring in absence of practical considerations of their facilities. This happens mainly due to the lack of clear policies and strategies in their future plans. Consequently, shortage or surplus in some facilities include space areas. The situation become obvious when organizations witness either under-occupying or over-occupying situation in their purpose buildings after they move in, though the purpose building is supposed to be designed according to the existing and future scope of the organization. The municipality of Makkah building in Maabeda is witnessing an overcrowding situation just four years of occupying the building. This was reported through an interview with some staff regarding the level of perceived workspace area. The governmental organizations accommodate their staff either through rented buildings or purpose building. Rented buildings are usually built for multi use, whereas purpose buildings are those which were especially designed for organization staff to occupy.

THE CONCEPT OF WORKPLACE COMPLEX AND SHARING FACILITIES.

The paper argues that through the provision of workplace complex which accommodates several governmental organizations, organizations could use their facilities effectively. Workplace complex in this research is defined as an open plan office space floors devoid of any internal partitions or subdivisions and equipped with all necessary

services and electromechanical utilities (Fig.1). Each organization is supposed to subdivide its own allocated space and create its own layout on the basis of the employees' needs. Workplace complex is designed to accommodate several organizations in one physical building. Organizations residing this complex could expand and shrink their office space requirements freely. It is hypothesized that through the implementation of workplace complex concept, Saudi organizations could manage their space asset effectively where unused space is always let to organizations suffering from space shortage. This concept is developed on the basis of the need to understand spatial requirements of governmental organizations under one umbrella. There was some attempt in some region of Saudi Arabia, where organizations have been allocated near each other in one site but in separate buildings in order to make it easier for staff and people to finalize their multi-work transactions; however, each organization remains independent from the others.

Workplace complex concept of this paper has several advantages:

1. Ease of implementation of policies related to space planning and management. Each organization will be able to develop its spatial standards for staff in a way that its spatial requirements are always defined over its lifecycle.
2. Abandonment of the traditional idea of one building, one organization, which could create some organizations with surplus in office space, and others with shortage of it. Workplace complex allows organizations to exchange office space among each other according to their future expansion and shrinkage policies, since they are accommodated in one physical building. Letting the surplus of office space will be reflected positively to organization budget, while letting it to organizations suffering from shortage will help these organizations improve their physical environment conditions and dispose of overcrowding situation, the organization's most effective factor hampering productivity.
3. Ease of managing and surveying all facilities (i.e. space, equipment, staff and furniture) since they are in one building, which enables organizations to manage these facilities for maximum utilization.
4. The concept of rotation of facilities among organizations becomes possible. This approach enables organizations to move and rotate facilities according to actual needs. The concept fosters the dilemma of shared facilities to better utilization of facilities.
5. The concept of office space complex will allow staff belonging to different organizations in governmental sector to meet face to face informally while they are moving inside the building. This could give them good opportunity to communicate informally through discussion and sharing opinions.
6. Workplace complex will occupy most governmental organizations in one building. Visitors who need to visit more than one organization can do it easily with less time and effort. This is unlike the existing situation, where visitors need to travel among different organizations in different neighborhoods which cost them more time and effort.
7. Ease of formal communication among governmental organizations due to the physical proximity. This could help to eliminate much misunderstanding and solve many problems among these organizations.

RESEARCH METHODOLOGY

Seven buildings belong to different Saudi governmental organizations at Makkah were included in the study, as listed in Table (1). Buildings will be called by numbers as listed in Table (1) throughout this research. These are purpose, not rented buildings.

Purpose buildings are defined as those which were designed especially for these organizations. Cases were selected to cover the most popular organizations in Makkah. It is expected that these organizations are experiencing almost the same facility policies regarding spatial standards in particular (i.e. an expected number of square meters designated for different staff group according to status) as they all belong to the governmental sectors.

The survey is launched as a post-occupancy evaluation investigated the number of square meters assigned for each staff. At least 50% of the staff in each building was investigated. The staff were investigated in terms of three groups: *secretaries* who perform repetitive and tedious jobs, *administrators* who perform detailed jobs, and *managers* who perform complicated jobs. The three groups were adopted due to the growing evidence which relates task characteristics and job complexity to workspace size (Duffy, 1974; Sundstrom, 1986). Table (1) shows the number and percentage of each group of staff.

The actual office space area assigned for each group of staff in each building was investigated through direct measurements of workspaces. Table (2) shows the average actual area designated for each group of staff in the post-occupancy evaluation for the seven cases. This was matched against the desired office space ratio for each group obtained from a questionnaire distributed among the participated staff. Unfortunately, nothing has been found in Saudi organizations determining the space norms and standards for different groups of staff. This means that governmental organizations do not have official spatial standards which may govern the allocation of office space to staff. The research, therefore, adopted the standard developed by the staff's reaction with their satisfaction with their given office space as a benchmark for assessing the existing situation. This standard represents the staff desired office space developed from their perception. Table (3) shows the desired office space area for each group of staff.

In order to assess the existing situation for each building, both existing and desired office space ratio for each group were compared. This will enable us to evaluate the situation in each organization. Some were found to cope with the situation by having desired office space ratio close to the existing ratio. Others could experience shortage or surplus in office space, as shown in Table (5).

RESULTS & DISCUSSIONS

Table (2) shows that *Secretaries* in buildings 5 & 6 witnessed the lowest office space area with 4.75 sq.m. and 3.49 sq.m. respectively, whereas, they were the highest in buildings 1, 2 & 4 with 12.85 sq.m.,10.90, and 14.93 sq.m. respectively. *Administrators* were experiencing an average of around 7.0 sq.m. in all cases except in buildings 2 & 4 with around 10.0 sq.m., and in building 5 with 4.41 sq.m. *Managers* were found to be the most luxurious group in office space with an area between 13-24 sq.m. , except in building 5 with 4.60 sq.m..

In general, the three groups of staff showed different trends of variation in their office space possession. Results support the argument which relates task characteristics or job complexity to office space size only on *managers* level, and *secretaries* and *administrators* taken together on the other level. *Managers*, the group of the highest degree

of job complexity, possessed the highest average office space. The variation between *secretaries* and *administrators* is almost negligible though *administrators* perform more complicated jobs. This could be due to the need for *secretaries* to accommodate more office furniture like cupboards and other supporting facilities to receive customers.

Table (4) shows the significance of variation among the three groups using ANOVA test. The significance of variations among the three groups was clearly demonstrated in buildings 7 and 3 at a significance level of $p<0.001$. Variations diminish in buildings 2, 1, 6, 4, and 5 respectively.

Figures in Table (3) reveal results of the satisfaction of the three groups of staff; *secretaries*, *administrators* and *managers* with office space area at a level of 6.99 sq.m., 6.81 sq.m., and 11.69 sq.m. per each group respectively. Results obtained through a distributed questionnaire among participated staff. The comparisons of cases to one another were performed by matching the existing office space ratio with the desired ratio (satisfaction level) in order to calculate the shortage and surplus in office space in each building. Table (5) shows the surplus and shortage in office space for the three groups. This is calculated by matching the actual average designated office space for all staff in the groups against the desired office space ratio (satisfaction level).

Secretaries in buildings 1,2,3,4, and 7 witnessed surplus in their office space with 198.9 sq.m, 42.9 sq.m, 62.0 sq.m,111.0 sq.m, and 228.7 sq.m. respectively. The total surplus [of] their office space in these buildings is 643.5 sq.m. However, they experienced shortage in buildings 5&6 with 432.0 sq.m, and 986.3 sq.m respectively, with total shortage of 1418.3 sq.m.

The same investigation was performed on *administrators* and *managers*. *Administrators* were found to have a surplus in buildings 2,4, & 6 with a total of 545.9 sq.m, and a shortage in buildings 1,3,5 & 7 with a total of 984.1 sq.m . *Managers* , on the other hand, were also found to have a surplus in all but building 5 with a total of 482.4 sq.m , and a shortage in building 5 of 134.7 sq.m.

It is clearly noticed that within the same organization, no clear management policy of office space was adopted. The appearance of surplus and shortage values among the three groups of staff within the same organization is clear evidence for the organization's failure to distribute its allocated total office space among the three groups of staff according to their expectations. This means organizations failed to exchange office space among their own staff. Table (5) shows that the total unused office space in all buildings is 1671.8 sq.m. while the total shortage is 2537.1sq.m.

Organizations would have the ability to let their surplus in office space through the notion of workplace complex. If it is applied to these buildings, the surplus will disappear and a shortage of only 865.3sq.m. remains.

Table (6) calculated the total financial loss in each building including the cost, operation and maintenance of unused office space through its lifecycle. It is estimated that a total of SR 835,900 (US $ 222,906) is wasted annually due to the failure to let the unused

office space in these seven buildings only. The loss is estimated to reach up to SR 10 millions (US $2.67 million) annually on the city scale, and SR90 millions (US $24 millions) annually on the country scale.

The merit of workplace complex is not only to allow and urge each organization to distribute its total allocated office space among their different groups of staff according to their constant needs, but also to allow organizations to borrow and lend office spaces among each other according to their future expansion and shrinkage. This will reduce the office space cost among organizations through letting the unused space. Organizations of office space shortage will also have an opportunity to solve the overcrowded situation of their staff, thus, enhancing their workplace environment .

CONCLUSIONS

This paper suggests that through the implementation of workplace complex concept, organizations will have the opportunity to exchange their facilities including their physical spatial asset in a way that the shortage and surplus in office space among organizations are minimized. The research concluded that the surplus amount of office space in the adopted buildings weigh heavily on organizational budgets, due not only to the cost of unused space, but also to the cost of its operation and maintenance. On the other hand, buildings which experienced a crowded situation represented in this research as a shortage in office space could suffer from unsatisfactory office environment, which might influence employee's productivity.

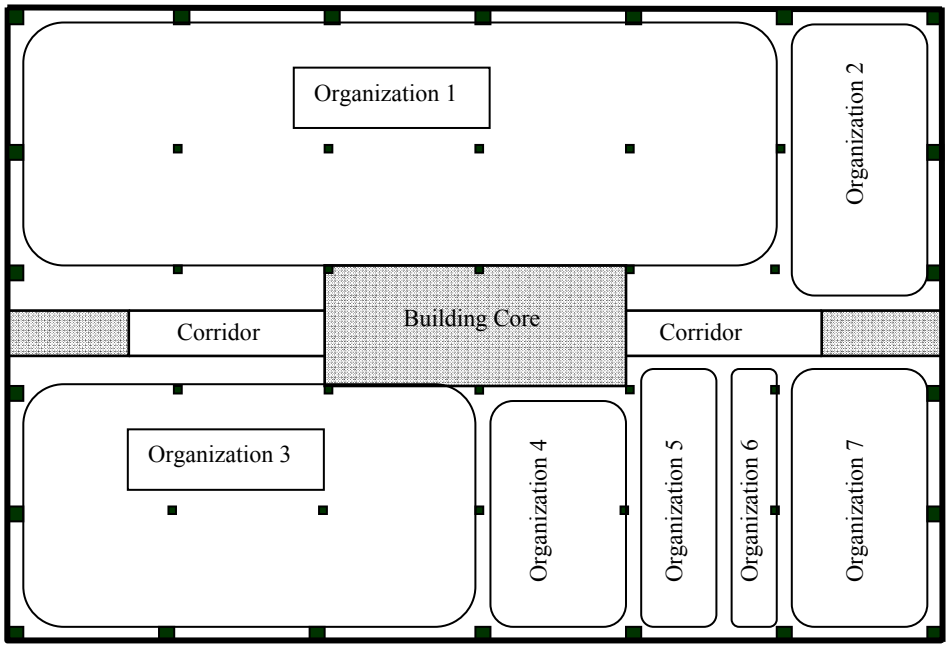

Fig. (1) Typical office layout represents workplace complex concept as an open plan office space devoid of any internal partitions or subdivisions. Organizations will have the opportunity to expand or shrink in their space asset as needed.

Table (1) Number and percentages of the three types of staff: *secretaries*, *administrators*, and *managers* in the adopted case studies.

Buildings	Number of staff						
	Secretaries S		*Administrators* A		*Managers* M		Total 100%
	No.	%	No.	%	No.	%	
1.Main Post Office	34	18.89	138	76.7	8	4.44	180
2.Nagabah of Transportation	11	16.67	48	72.73	7	10.61	66
3.Ministry of Education: Ladies' branch.	31	29.52	61	58.10	12	11.43	105
4.Ministry of Civil Service-social Insurance	14	20	48	68.57	8	11.43	70
5.Ministry of Education: men's branch	192	32	389	64.83	19	3.17	600
6-Water and Sanitary Dept.	281	31.61	575	64.68	33	3.71	889
7-Main Municipality	103	41.9	129	52.4	14	5.7	246

Table (2) Average of actual area designated for each group of staff in the post-occupancy evaluation for the adopted cases.

Bldg. No.	Average of actual area designated for each group of staff sq.m./staff		
	Secretaries S	*Administrators* A	*Managers* M
1	12.85	6.55	12.75
2	10.90	9.54	19.33
3	9.00	6.74	23.80
4	14.93	11.26	16.82
5	4.75	4.41	4.60
6	3.49	7.16	13.50
7	9.22	6.73	24.15
Average	9.31	7.48	16.42

Table (3) Desired area per staff for the three staff groups.Results obtained through a questionnaire investigating staff reaction to their level of satisfaction with the designated office space.

Bldg. No.	Average area desired for each group of staff sq.m./staff		
	Secretaries S	*Administrators* A	*Managers* M
1	13.00	7.34	14.33
2	4.63	4.90	11.67
3	7.42	6.50	19.25
4	9.35	8.72	11.71
5	3.78	4.24	5.26
6	3.98	7.53	12.67
7	6.76	8.42	6.96
average	6.99	6.81	11.69

Table (4) ANOVA test for all buildings, reveals the significance (*p-value*) of variations among the three staff groups.

Bldg. No.	Sum of squares Within +between groups	Df Total	Mean square Between groups	F	Significance *p*
1	807.99	21	31.30	3.40	*0.0540*
2	1988.48	25	250.32	3.87	*0.0360*
3	2495.01	29	2	9.94	*0.0009*
4	1303.02	16	86.0	0.577	*0.5740*
5	76.23	24	0.332	0.09	*0.9080*
6	5758.11	23	622	2.89	*0.0780*
7	524.02	29	127.6	12.82	*0.0001*

Table (5) Surplus and shortage in office space in the seven buildings for the three types of staff groups. Surplus is shown in positive values, shortage in negative values.

Bldg.	Actual area designated to staff. sq.m./staff			No. of each group of staff.			Surplus and Shortage in office space. Sq.m.			Total space balance Sq.m.		Total if workplace complex applied Sq.m.
	S	A	M	S	A	M	S	A	M	surplus	shortage	
1	12.85	6.55	12.75	34	138	8	+198.9	-35.9	+8.5	+207.4	-35.9	+171.5
2	10.90	9.54	19.33	11	48	7	+42.9	+131.0	+53.5	+227.4	0.0	+227.4
3	9.00	6.74	23.80	31	61	12	+62.0	-4.3	+145.3	+207.3	-4.3	+203.0
4	14.93	11.26	16.82	14	48	8	+111.0	+213.6	+41.0	+365.6	0.0	+365.6
5	4.75	4.41	4.60	192	389	19	-432.0	-933.6	-134.7	0.0	-1500.3	-1500.3
6	3.49	7.16	13.50	281	575	33	-986.3	+201.3	+59.7	+261.0	-986.3	-725.4
7	9.22	6.73	24.15	103	129	14	+228.7	-10.3	+174.4	+403.1	-10.3	+392.8
Total Sq.m. if workplace complex applied							-774.8	-438.2	+347.7	+1671.8	-2537.1	-865.3

S= *secretaries* A=*Administrators* M=*managers*

Based on table (3)which identifies the desired area per staff as follows:

-Desired area for *secretaries* S=6.99 sq.m.

-Desired area for *Administrators* A=6.81 sq.m.

-Desired area for *Managers* M=11.69 sq.m.

Table (6) Annual loss in organizations due to the failure to let the surplus office space.*

Building	Surplus in sq.m.	Annual loss due to unletting in Saudi Riyals SR	Annual loss due to unletting in US $
1	+207.4	103,700	27,653
2	+227.4	113,700	30,320
3	+207.3	103,650	27,640
4	+365.6	182,800	48,746
5	0.0	0.0	0.0
6	+261.0	130,500	34,800
7	+403.1	201,550	53,746
Total	+1671.8	835,900	222,906

* Calculation is based on a hiring cost of 500 SR/sq.m. annually (market price for office building).

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