

EVALUATION OF OFFICE SPACE UTILISATION IN SOUTH AFRICAN MUNICIPALITIES

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ABSTRACT

Purpose: Office space planning requires design skills and space planning norms to ensure space efficient office areas allowing occupants to perform optimally. No specific space norms exist for South African municipalities. Municipal facilities are unique and fulfil many functions, challenging the application of space norms. This study was part of work commissioned by the Development Bank of South Africa (DBSA) to understand municipal office space use in preparing a guideline for future municipal office building funding applications. The study evaluated current South African municipal office space allocation, compared it to office space planning norms for South African organs of state and identified possible challenges to applying the said space planning norms to municipal office space planning.

Design: The study was based on data from fieldwork surveys by professional quantity surveyors and valuers on municipal office space utilisation. Time and cost constraints restricted the survey to non-metropolitan municipalities in four provinces. The study adopted qualitative and quantitative methods to reach the findings.

Findings: The study revealed significant comparisons and deviations from South African and international space planning norms and identified challenges for municipalities to apply space planning norms.

Value: This study provides insight into the current state and efficiency of municipal office space utilisation. By identifying challenges for applying space planning norms to municipalities the study suggests where future action should be focused to address the problem.

KEYWORDS

Municipalities, office space, South Africa, space allocation, space norms,

INTRODUCTION

"The reality of a building consists not in the walls and the roof, but in the space within," (Lao-Tse, philosopher). Buildings, specifically functional buildings such as auditoriums or shopping centres are designed for a specific use. The internal layout of office buildings may differ significantly from a call centre with large open plan area and a few offices for management to a medical practice with private offices and an open plan waiting area. Industry reference data [1] confirmed that the organisation of office work will affect the requirements for office space. The internal layout of office space will also be affected by the organisation's organogram (organisation structure). Management may command more generous office and supplementary space with open plan or cellular office space typically being provided for operational functions [2].

Municipal facilities are unique as they fulfill a wide variety of

functions such as offices, council chambers, city halls, public service areas, technical support facilities, etc. Evaluation of space allocation in municipal buildings therefore presents challenges and cannot necessarily be compared to other buildings. This study, however, focused only on municipal office facilities and the differences found within the internal layout of municipal offices and the related space norms.

The Local Government: Municipal Systems Act 32 of 2000 Vol. 425 [3] defines municipalities as organs of state with a separate legal entity within the local sphere of government exercising legislative and executive authority within a determined area.

The South African Department of Public Works (DPW) issued a space planning norm guideline document called the Space Planning norms and standards (SPNS) for office accommodation used by organs of state [4]. This study investigates if the current office space utilisation in South African municipalities indicates an efficient use of space, as required by the Department of Public Works Space planning norms. The study also evaluates if deficiencies or challenges are experienced by municipalities in applying the abovementioned office space guidelines.

Importance of the study

The study forms part of work commissioned by the DBSA to better understand municipal office space use in preparing a guideline for future municipal office building funding applications. The study evaluates the current state of office space utilisation in South African municipalities against norms in office space planning and if specific challenges exist to applying the SPNS to municipal office space planning.

This study provides insight into the current state of office accommodation in municipalities and also reveals significant comparisons with and deviations from South African space planning norms as well as those of international norms. The study assists in identifying problems faced by municipalities attempting to apply the SPNS, highlighting suggestions for further study.

RESEARCH DESIGN

The DBSA fieldwork survey required careful selection of the sample of municipalities to be included as well as the information to be gathered from each municipality. This involved a process of elimination that considered classification and sizes of municipalities, selection of provinces, selection of towns and municipalities and definition of work categories. The Gaffney Group's Local Yearbook for 2007 – 2008, [5] on local government in South Africa categorised municipalities into small municipalities (less than 50 000 people being serviced), medium (50 000 to 150 000 people being serviced) and large (more than 150 000 people being serviced). To avoid distortion of the findings, the DBSA decided to exclude the large metropolitan municipalities as well as their provinces from the research sample. Due to time and budget constraints it was decided to only include four provinces

i.e. Free State, North West, Mpumalanga and Eastern Cape in the research. Within each province a range of one large, two medium and two small municipalities were selected to serve as sample for the DBSA fieldwork survey.

To prevent distortion by the richest or poorest municipalities a wealth factor was calculated for each municipality by dividing the municipal operating budget by the number of households being serviced. Municipalities at the highest and lowest ends of the wealth factor range were excluded from the sample. The annual wealth factor calculated for all municipalities in the four provinces varied between R2 290.00 and R12 065.00 per household. The 46 municipalities selected for the sample had annual wealth factors varying between R4 000.00 and R7 000.00.

The different categories of municipal office spaces to be measured by the fieldwork survey teams were also carefully considered. Detailed and objective findings required a structured gathering of data of the different disciplines of office spaces typical found in municipal offices. The credibility of the findings required apples-with-apples comparison of the data. The gathering of data was structured to allow for separate measurements of council chambers, mayoral parlour, municipal manager administration, treasury, engineering, parking and roads, community service and others (porte-cochere, covered walkways, sheds, etc.). The SPNS was used as reference against which the survey measurements were compared and the survey measurements therefore had to accommodate the different work categories of the SPNS. The SPNS allows for: administrative offices (6 – 8 m²), technical & management (8 – 16 m²), senior management (16 – 20 m²) and executive management (20 – 25 m²). Specific office space types such as large entrance foyers, open plan cashier halls and town halls were omitted to prevent distortion of the findings

The fieldwork survey was conducted by four teams equipped with steel tape measures, lasers and digital cameras. To ensure consistency in measurement a pilot survey conducted by a team consisting by one person of each team was undertaken prior to the start of the fieldwork survey to serve as a training session and create a sound basis for all the following surveys.

Prior to the fieldwork surveys, the relevant municipalities were contacted to inform them of the survey and to obtain permission and co-operation. Each municipality was also requested to provide an organogram of their office organisation providing information on the structure of the organisation.

Data measuring tool

The study required the average size of office to be calculated per category, size municipality, province, etc. Severe or substantial deviances from the averages, such as completely open plan areas or extremely large or small office spaces were removed from the data to prevent distortion. The calculated average size of categories of offices in small, medium and large sized municipalities in each province was regarded as a 'fieldwork survey space norm'. For ease of comparison, the average office sizes calculated were rounded to the nearest m². The data range for, e.g., administration offices measured as 16.73m² (small), 19.84m² (medium) and 21.13m² (large) would be reported as 17 – 21 m².

The calculated fieldwork survey norms were compared to the SPNS and an allowable deviance therefore had to be set. It was decided that both the lowest and highest end of the fieldwork survey data range should be within 10% from that of the SPNS range. If the fieldwork data range fell within the allowable deviance range the space allocation was regarded as within acceptable norms. If the lower end of the fieldwork data range fell within the allowable deviance range, but the higher end was higher than the allowable deviance, space allocation was regarded as acceptable but higher than the acceptable norms. If the lower end of the fieldwork data range was also higher than the higher end of the allowable deviance range, the space allocation was regarded as to be excessive.

If the higher end of the fieldwork data range fell within the allowable deviance, but the lower end was lower than the allowable deviance, space allocation was regarded as acceptable but lower

than the acceptable norms. If the higher end of the fieldwork data range was lower than the lowest end of the allowable deviance range, the space allocation was deemed as excessively low.

Measuring of challenges

The study also investigated if any significant challenges were discovered to applying space norms to municipal offices. Evaluation of the above was based on the identification of problems with one or more of the following steps required to successfully apply the SPNS:

1. Obtain organisational information
2. Develop and area schedule
3. Determine support space to each organisational grouping
4. Determine core function space of the building
5. Allow for structural elements

REVIEW OF RELATED LITERATURE

Definition of space planning and space norms

Interior design is about creating interiors with spatial qualities that are habitable for people of all levels of experience: aesthetically, functionally, psychologically and economically aimed to achieve comfort and efficiency [6]. Space planning consists of creating functional, productive, efficient and flexible working areas through optimal use of space within a building and within the design constraints thereof [7].

Space norms are instruments to measure and evaluate efficiency of space planning and allocation. This was confirmed by a study [8] on building-norm system for medium-security prisons in South Africa. Mathews also argued that that space norms should be used as a planning instrument and will affect the design team and other construction consultants, such as quantity surveyor and project manager.

The Department of Community Development (DCD) issued the space and cost norms for office buildings, funded wholly or partially by the state in 1983 [4], that defined space norms as the total assignable area for the staff, office functions, and office equipment.

In defining space planning and space norms, it is also necessary to understand ergonomics and facilities management which both affect space planning and the office environment. The International Facilities management association (IFMA) defined ergonomics as the study of people's efficiency in their working environment, the science of designing the job, equipment and workplace to fit the worker [9]. The IFMA also defined facilities management as a profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, process and technology [9].

According to well-known and recognised industry norms, [1] space norm is more than merely allocating an average amount of space to a person. Psychology in the work environment is affected by space allocation and refers to productivity and efficiency of people in the workspace and how they experience it. A more recent study [7] supports the concept that a person's work environment directly influences psychology and morale. Individual productivity is tied to performance of the person in the environment. Performance and productivity in the workplace is supported by physical comfort, psychological comfort and functional comfort.

Evolution of office space

Office buildings and the design of office space have evolved over time. According to well-known industry norms [1], the layout of office space has changed dramatically since the 1950s. Work has become more streamlined and automated, requiring less space. Smaller and portable computers, electronic filing and hot desks where a number of employees share a single workstation decrease the requirement of space. A more recent industry review [10] agrees that an evolution in architecture and in office occupants'

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requirements has allowed for more modern and efficient ways of executing work.

Determining floor area requirements

Often used industry norms [1] accept that office requirements are calculated in two parts: people space and non-people space (machine rooms and circulation areas). More recent opinions [11] refer to non-people spaces as “We” space and people space as “I” space. People space (“I” space) consists of standard individual space and an allowance for immediate ancillary needs and a factor for primary circulation.

The internal space planning of offices is influenced by structural members such as columns, beams and brick walls as well as various shapes and configuration of buildings [1]. The SAMCO report [3] in discussing office layout and design said that offices should be north facing (towards the sun) with service cores located on the south face and that office efficiencies of between 75% and 90% should be aimed for. Other researchers are of opinion that designers should approach space planning by understanding and optimising the ‘language bridge’ of business and technology, buildings and design with people and culture [11]. He also links the close correlation between organisational structures and office layouts.

History of space norms

Early studies confirmed that [12] office planning started as early as the late 1950s when the workplace was still regarded as a united whole with many complex interactions. Later work [13] supported the early opinion, saying that between 1950 and 1960 an office building boom was created due to the expansion of businesses. The development of space planning was a response of corporate growth - a response to the needs of that time.

The application of space planning norms can be found in various industries for various types of building. Work done on the application of norms in South Africa [8] confirms that space planning norms can be applied to health services, educational facilities and public office buildings, correctional facilities, hotels & motels and airports.

The SANS National building regulations (NBR) [14] provides basic allowances of the minimum allowable space and forms a logical starting point for any design. The NBR, however, does not assist in space planning. According to the SANS NBR, the minimum allowable floor area for any liveable room is 6 m² and the minimum floor space per person in an office building is 15 m².

Space norms in municipalities

The Department of Community Development (DCD) [15] developed a guide in 1983: Space and cost norms for office buildings funded wholly or partially by the state to establish standards and create a convenient way of estimating the area requirements and cost of office buildings. This study focused on South African municipalities or the third level of government, the DCD space and cost norms guide was deemed to be applicable

The Department of Public Works SPNS for office accommodation used by organs of state [4] is a space planning tool that has evolved over time and allows for space planning trends having moved from purely cellular offices to a mixture of cellular and open plan offices.

Application of space norms

The steps of how space norms should be applied during the space planning of office buildings according to SPNA and are supported by developed guidelines [16] are: Obtain organisational information; develop an area schedule; determine support space to each organisational grouping; determine core function space of building and allow for structural elements.

EVALUATION OF DATA

The fieldwork data was processed and summarised in order to be compared to the work category descriptions found in the SPNS. The result of the processed data is summarised in Table 1 to indicate average space ranges for each work category, for each size municipality in the four provinces.

The calculation of the total office area for a category consists of the totals of each province, divided by the total number of offices. The averages of the different sizes of municipalities indicate that in 75% of the cases the large sized municipalities are providing on average the largest office space allocation. Comparing the different provinces did not provide any clear trends of over or under allocation of space. No other trends or specific deviations were identified

The information summarised in Table 1 was used to create an office space data range. This space data range has a space norm range that is neither too wide nor too narrow and could be tested against other norms ranges.

The fieldwork survey space norm was then compared against the SPNS. This is the most recent space norm which is applicable to municipal facilities. Table 2 compares the fieldwork survey norm range with the SPNS: Column A indicates the norms provided in the SPNS. Column B provides the allowable deviance from the SPNS norms. Column C provides the Fieldwork data range derived from the average totals. Column D comments on the measurements of the fieldwork data range compared to the allowable deviance, which is based on the SPNS norms. The categories measure as follows:

Administrative: the lower end of the fieldwork data range is higher than the higher end of the allowable deviance range, therefore the space allocation is deemed to be excessive.

Technical and management: the lower end of the fieldwork data range falls within the allowable deviance range, but the higher end falls outside of the allowable deviance, therefore the space allocation is acceptable but tends to be higher than the acceptable norms.

Senior management: same result as technical and management, therefore the space allocation is acceptable but tends to be higher than the acceptable norms.

Executive management: same result as senior management and technical and management, therefore the space allocation is acceptable but tends to be higher than the acceptable norms.

Other available office space norms such as Space and cost norms [15], the space norms stated by Dovey [3] for South African offices in general and Neufert & Neufert's [1] space norms for general offices within the UK. Table 3 compares the fieldwork results with the other available space norms:

Table 3 indicates that the fieldwork norm range is generous compared to most other office space norms. It may be concluded that the current office space in South African municipalities is being underutilised or that municipalities typically provide larger office sizes than what is needed. This could imply a few things:

- Municipalities could accommodate more employees within the buildings currently occupied.
- Municipalities could rather occupy smaller offices.
- The facilities may have been sufficient at some point in time, but has now become underutilised.
- Municipalities are occupying buildings that are available (even though they may be too big), and not buildings that are necessarily addressing their space requirements.

It should be noted that most municipal facilities are hosted in older buildings, some dating back to the early 1920s. These older buildings have internal brick walls and often do not lend themselves to open plan offices. Office sizes are therefore mostly fixed. The SPNS are more recently developed norms and is based on allowance for open-plan offices.

Table 1: Fieldwork data range.

		Small Municipalities	Medium Municipalities	Large Municipalities	Data range
		Average area (m ²)	Average area (m ²)	Average area (m ²)	
Administration: Average Total		17.03	19.84	21.13	17 - 21 m²
	Free State	21.13	18.31	22.12	
	North West	14.38	21.87	22.84	
	Eastern Cape	17.41	16.62	13.12	
	Mpumalanga	14.05	19.05	19.97	
Technical & Management: Average Total		18.17	19.42	18.06	18 - 19 m²
	Free State	19.02	19.35	21.19	
	North West	20.05	21.68	15.60	
	Eastern Cape	16.44	15.63	15.94	
	Mpumalanga	17.55	16.72	19.75	
Senior Management: Average Total		20.20	22.84	25.23	20 - 25 m²
	Free State	20.11	25.44	27.41	
	North West	14.93	19.10	21.48	
	Eastern Cape	24.38	21.00	21.00	
	Mpumalanga	21.73	22.94	30.19	
Executive Management: Average Total		24.10	29.47	31.29	24 - 31 m²
	Free State	21.58	32.65	33.81	
	North West	22.48	31.29	32.80	
	Eastern Cape	26.81	15.56	22.78	
	Mpumalanga	25.02	35.16	48.00	

Table 2: Measuring fieldwork norm against the SPNS.

	SPNS norms	Allowable deviance in range	Fieldwork data range	Testing fieldwork data to allowable deviance
	A	B	C	D
Administrative	6 - 8 m ²	5 - 9 m ²	17 - 21 m ²	excessive
Technical & management	8 - 16 m ²	7 - 18 m ²	18 - 19 m ²	acceptable but high
Senior management	16 - 20 m ²	14 - 22 m ²	20 - 25 m ²	acceptable but high
Executive management	20 - 25 m ²	18 - 28 m ²	24 - 31 m ²	acceptable but high

Table 3: Comparing fieldwork data to other space norms.

	Fieldwork data range	SPNS norms	Space and cost norms (1983)	Dovey (1997)	Neufert & Neufert (2000)
Administrative	17 - 21 m ²	6 - 8 m ²	10 - 12 m ²	9 m ²	6.70 m ²
Technical & management	18 - 19 m ²	8 - 16 m ²	12 - 16 m ²	10 - 12 m ²	9.30 m ²
Senior management	20 - 25 m ²	16 - 20 m ²	20 - 24 m ²	20 m ²	13.40 m ²
Executive management	24 - 31 m ²	20 - 25 m ²	32 - 52 m ²	20 - 30 m ²	28.00 m ²

Discussion on fieldwork constraints

The literature review confirmed the importance of an organogram for space planning. However not one of the municipalities visited could provide an organogram. This proved to be the single most important constraint to the fieldwork. A properly developed or-

ganogram would have guided and assisted the fieldwork survey. The SPNS guideline on the application of norms requires organisational information to be obtained, such as size and structure of human resources, strategic objectives, activities, internal and

external relationships, culture and work processes. Municipalities should develop organisational structures or organograms to assist their space allocation.

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CONCLUSIONS

Space norms and office space planning affect most working environments. This research evaluated space allocation against existing space norms. Space planning norms can be applied to many organisations with efficient results terms of efficiency, staff morale and space use.

The research indicated that most South African municipalities allocate too much office space to their occupants raising the option of using smaller office facilities with the associated cost saving. It may however also raise the question if office efficiency would be improved or negatively affected by using smaller office facilities.

The research highlighted the importance of the space planning process and provided a clear step-by-step process of applying space planning to office facilities. The research has proven that South African municipalities fail to provide sufficient organisational information to apply the space planning process. This highlights topics for further research.

In conclusion, the research findings make it easy to see why proper planning for office space planning is necessary and that the application of norms, whether for municipal offices, or any type of office accommodation can be useful.

RECOMMENDATIONS

The research identified many topics for further study, which would contribute to the overall picture of space norms and office space planning, with special reference to South African Municipalities:

1. To repeat the survey on office space utilisation but for the remaining five provinces.
2. To evaluate the space planning in large metropolitan municipalities.
3. How does current government spending on office accommodation compare to the expenditure requirements provided in space and cost norms for office buildings funded wholly or partially by the state (1983)?
4. What is the implication of municipalities not having organograms readily available for reference or use?

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APPENDICES

Appendix A - Letter to DBSA requesting consent to use appraisal study information for the research.

Appendix B - DBSA letter of consent to use appraisal study information for the treatise.

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