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Spatial Performance Impact on the Employees' Productivity and Satisfaction: Implication on Coping Strategies to the Working Space

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Abstract
This paper aims to present the Research Results conducted on the area of Architecture and Behavior in relations to the Environmental Psychology. The research executed to see how the space performs to meet the user needs which hence leads to their work productivity and satisfaction. The spatial assesments involves the physical and psychological condition of space. Furthermore, this is also a study how those variables imply on Coping behavior to their workspace. This study will use the case study of workplace occupied by employee in the field of academic or in the university in Jakarta, Indonesia. Post occupancy evaluation is employed which involves interviews with the employee and observation to the spatial conditions. Based on the findings, the Spatial Performance - both Physical and Psychological Performance – simultanuously has an influenced to the Workproductivity, Satisfaction of Spatial Availability including this Space Quality and Information and Communication Technology (ICT) Facilities. Only the Psychological Performance on the spatial assesments has shown not significantly influencing the employees' work productivity. It is also found that satisfaction is to lead to the after-effects of workers' efforts at coping strategies to use their space so called space adjustments.
Keywords: spatial performance, workspace, productivity, satisfaction, coping strategies

1. Introduction

Working is one activitiy significantly conducted by people as an individual in daily basis. It is considered significant since people works daily and only 2 (two) days in a week people do not go for working. Even more, people spend most of their time for working for more than 9 (nine) hours a day. The use of workspace is becoming crucial to see whether people feel comfortable using their working space and later on to increase their productivity day by day. This is important for any corporates to understand how to provide a proper space and design for their workers, which it will end up with the high-gained revenue in return to the company in the later day. The research was then conducted to oversee how spatial aspects will lead to the workers' productivity and its relationships towards a satisfactions of workers and their intention to conduct any coping acts to their workspaces.

2. Theoritical Framework : Spatial Performance, Work Productivity, Spatial Satisfactory and Coping Behavior

2.1. Spatial Performance: Physical & Psychological Performance

One of significant factors required to consider in order to have a well-productive worker is presumably – availability of workspace. Previous research has suggested that employer's disengagement is increasing, therefore providing a workplaces positively influence the workforce (Peach and Slade, 2006). Spatial performance is therefore important to asses. As written in the book by Indriyati (2009), one of the factors which influences enviromental design is the need to understand the criteria for a well-built environment; these include to meet the needs of users in functional design and floorspace requirements. Goodrich (1982) in his research highlighted his results that workers appear to be more flexible in how they use their space. However, other research has found that adopting flexible patterns of space is unintended to provide not a fixed workspace for the employee, this is why Haynes (2007) argues this could be overlooked on the needs of behavioral items to express their identity by modifying their workspace.

Other than that, the factors which influence how well environmental design meets user needs is user perceptions of the physiological, perceptual and social conditions. Physical and technical problems also affect psychological feelings, such as limited floorspace creates poor circulation and stuffiness in the rooms and difficulty in making spatial arrangements (Komarudin, 1997). Psychological aspects are also crucial and required to be assesed. As previous research conducted by Sundstrom (1982a) reported that Privacy is a key requirement of workplace. The research was even found that office workers moving from enclosed to open-plan offices perceived a reduction in privacy – including these for their conversational and visual privacy (Sundstrom, 1982b). Peach and Slade (2006) in their research found that distraction will impact the workers. Goodrich (1982) points out that many design solutions might unintentionally reduce perceived privacy, particularly in the case of noises and movements

outside which are sudden and unanticipated and making them more distracting. The height partitions provide only visual privacy, but not they may fail to block noise from outside as reported by Maher and Von Hippel (2005).

One example can be used for the reference is indicators of spatial assessment used by Indriyati (2013). The indicators used for the research to assess the Spatial Physical Performance were: (1) Availability of Floor space; (2) Flexibility of the Room for its functions; (3) The Shape of Room for usage. Similarly, the indicators used to asses the Spatial Psychological Performance were (1) The Glare; (2) Heating Condition; (3) Freshness/Stuffiness of the room air; (4) Room's air circulation system; (5) The Room's level of Humidity; (6) Visual Privacy of room; (7) Conversational Privacy of Room; (8) Having a lock for the Room.

2.2. Work Productivity and Spatial Satisfactory

It was indicated from the latest study that distraction and other factors are also taken part to create the productivity. A well-performed of the workspace is perhaps a key root cause in employee engangement or disengagement (Peach and Slade, 2006). The research of engineers resulted that loss of production time and mistake occur due to distractions (Kupritz, 1998). In the book written by Martoyo (1994), it is mentioned that one of factors impacting work p0roductivity is physical setting. Another study by Duvall-Early and Benedict (1992) also found that with no distractions obtained from working in private space, hence, people feels better to use their abbilities and able to keep busy all the time and perceive better accomplishments. It has also stated that improvement made for the working enviroment reduces complaints and absenteeism and on the other hand, it even increases productivity (Roelofsen, 2002).

Indicators used by Wibowo in his thesis (2003) to asses the Work-Productivity were: (1)Working Attitudes; (2) Work Task Completion; (3) Work Efficiency; (4) Optimizing Working Time or Time Efficiency; (5) The Quality of Work Performance.

Productivity is possible in relations to the satisfaction. Robbins (1997) in his book has written that there is correlation between satisfaction toward their working environment which therefore lead to their attitude and behavior. He also states that work satisfaction describes a relationships among invidual, job and environment. Satisfaction emerged by an individual if they love the job and its environment (Cherrington (1999). However, theory by Luthans (2002) has stated that although workers like to work physically safely and securely, the physical conditions of workspace is not determining their satisfactions. In addition to that, Luthans (2002) also said in his book that the need of power, achievement and status can be considered to part of this level of satisfaction. This kind of appreciation given by the corporate could be in the form of priviledge for facilities which might be considered impacting their working performance. Providing facilities – a good working space and access to all information through technology uses with no burden – are becoming crucial to increase employees' working performance. The research, therefore, also uses the indicators for asessing satisfactions. It was questioning particularly in relations to their satisfaction level of space facilities and Access to the Information and Communication Technology (ICT) in the employer's work station.

2.3. Coping Behavior

Coping Behavior as defined by Purwanto (1999) is one if person meets his/her needs without reducing or even adding the space. It is to mention that people only need to do adjustment to the space. It is also stated by Wordworth & Marquis (1955) that Relationship can be made by individual with the environment in physical and psychological environment, non-physical or psychological and spiritual or scientific in someways, which one of those are to have individuals cope with or adapt with the environment. A need to cope with the physical environment through perceptions made by individual towards the physical object or environment. If individual cannot cope with the environment, it is continued to the stress and try to acts as an effort made to cope with the environment (Bell, Fisher & loomis Ross, 1978). A well-coped strategies involve adaptation and adjustment. The way we change behavior to fit our environment is classfied as Adaptation. On the other hands, the way we change the physical space to fit to our behaviour is defined as Adjustment Bell, Fisher & loomis Ross (1978). The latest is taken to be one variable used in the research. The research done is an attempt to see how various variables such as Spatial Physical & Psychological aspects will impact the satisfaction and individuals' decisions in taking coping behavior, particularly Adjustment to the Space.

One of previous research done by Indriyati (2006) has resulted that occupants living in all unit types in the vertical housing made a coping behavior to their space. The occupants took adjustment toward most of rooms within the unit as a result of their coping efforts needed to meet their need to function the space.

3. Research Methods

The research was conducted with a procedures and methodology which has met a standard to conclude a well-represented research. The specific area of education was chosen for the case study - University Employees – who are considered to have typical duties in running their task, both as a lecturers and researchers. Similar use of space functions and duration of those occupying the rooms were also noted as other reasons to choose particular business space and profession – like education. The data collections activity was proceed, taken from the officers who use their own space in an office of minimum ±3.00 sqm. A simple random sampling was taken out for the survey. Determining sample size has done through the Table produced by Krejcie and D. W. Morgan (1970) in Sarantakos (1998). The 69 (sixty nine) employees out of 81 employees who work for the University within the criteria were selected to be interviewed. Observation to space, focusing in physical room's assesments were also conducted to do cross checking for the respondent's answers in the interview process. It was calculated for about 85.19 % of a total employees who owns their separated work spaces were surveyed and observed.

Research Models used are to assess relationships between the 2 (two) variables which are Physical Spatial Performance and Psychological Spatial Performance. They both were used firstly to see its relationships. These 2 (two) variables also are each and both to be checked its impact toward the work productivity as well as satisfactory level of employees toward their workspaces. Those 2 (two) variables were also to work in assessing their impact the employees' behavior of coping - specifically the space adjustment. They made such adjustments toward the space in order for them retaining their work participation by the optimizing the use of their own workspace. Method of data processing with SPSS Software. Mixed Analysis Method was used. Correlations and Regression were used for analysis.

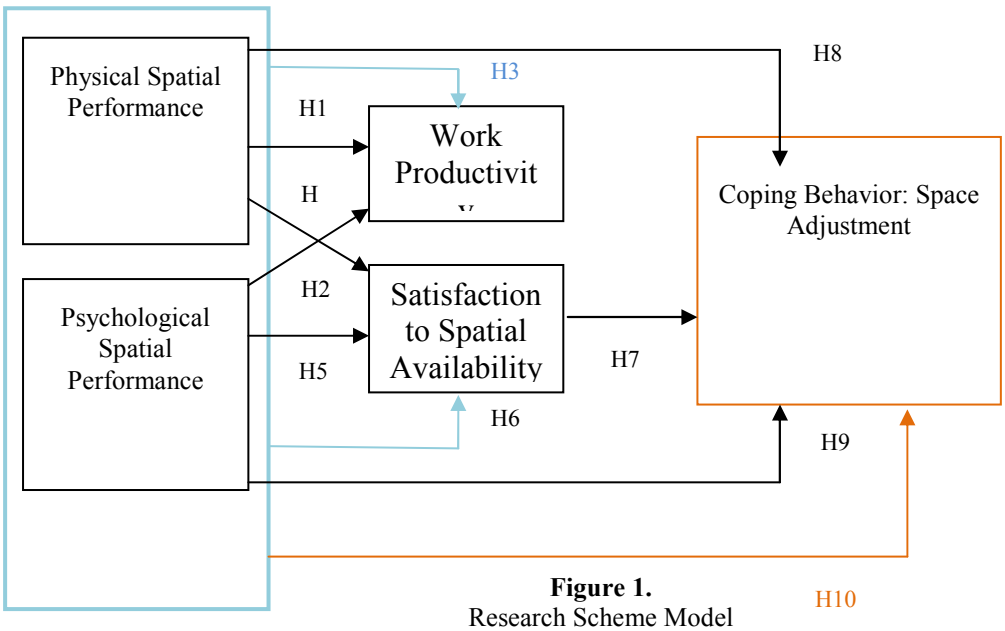

Figure 1.
Research Scheme Model

4. Results & Findings

4.1. Respondents Characters

Table 1 below is to show Respondents characteristics in majority. The majority of respondents was in fact taken from Middle-Management counting for 56.5% within the range of age >45-55 years old. It also shows those occupying their own space are middle-management positions working within the 3.00 – 6.00 sqm space. These highlighted characteristics are required to deliver in this paper in order to describe the rationality of the Samples taken with the findings obtained. It is also such an important data for a basis of discussion while data are then being interpreted.

Table 1.
Respondents Highlighted Characteristics

Characters	Item found in Majority	Frequencies (%)
Career Positions	Middle-Management	56.5
Age	>45 – 55 years old	36.2
Gender	Male	55.1
Floor space (sq m)	>3.00 – 6.00 sqm	40.6
Building Height (1st - 10th floor)	1st – 3rd floor	58.0

4.2. Workspace Conditions

This section shows sample of space taken from observation. It illustrates how the physical condition of room used for the employees' workspace. Although, they all various one with another, but it gives an illustration of the sites which were assessed by the respondents. Further, statistical results are presented below in Table 2.

Figure 2. Medium-Small Workspace

Table 2.
Results of the Partial and Simultaneous Assessments

	Hypotheses	Influenced/ R2 (%)	R Linier Cooeficient	P Value	Statistical Conclusions
H1	There is an impact of Physical Spatial Performance on the Work Productivity of the employee	34.2	0.585	0.002	Significant
H2	There is an impact of Psychological Spatial Performance on Work Productivity of the employee	18.2	0.427	0.125	Not-Significant
H3	There is an impact of **both** Physical and Psychological Performance on Work Productivity of the employee	39.6	0.629	0.033	Significant
H4	There is an impact of Physical Spatial Performance on the Satisfaction to Spatial Availability (Quality & ICT Facilities)	44.3	0.666	0.000	Significant
H5	There is an impact of Psychological Spatial Performance on the Satisfaction to Spatial Availability (Quality & ICT Facilities)	54.2	0.737	0.000	Significant
H6	There is an impact of **both** Physical and Psychological Performance on the Satisfaction to Spatial Availability (Quality & ICT Facilities)	59.8	0.773	0.000	Significant
H7	There is an impact of Satisfaction to Spatial Availability on Coping Behavior (Spatial Adjustment)	43.4	0.659	0.000	Significant
H8	There is an impact of Physical Spatial Performance on the Coping behavior (Space Adjustment)	44.1	0.664	0.000	Significant
H9	There is an impact of Psychological Spatial Performance on the Coping Behavior (Space Adjustment)	57.9	0.761	0.000	Significant
H10	There is an impact of **both** Physical and Psychological Performance on the Coping Behavior (Space Adjustment)	62.7	0.792	0.000	Significant

5. Discussion

The findings are significant and useful for the Architects and Interior Designers as well as for the Corporate Owners and Corporate Managements to provide an appropriate design for the employers' working space in the future. A better Workspace design will lead to increase the Productivity of Employee and their Working Performance.

The research has found that:

- The Spatial Performance - both Physical and Psychological Performance - has an influenced toward the Work productivity and Employers' Satisfaction to their working space including this Space Quality and ICT Facilities provided within their workspace.
- The Physical Spatial Performance indicates significantly influencing the employers' work productivity (0.002), It is to confirm that people absolutely needs to have a sufficient quality of physical setting for them to work efficiently.
- However, the Psychological Performance has shown not significantly influencing the employers' productivity (0.125). The Psychological Performance here is limited to the Psychological assesments taken for the employers' workspace. Below are possible interpretation for the results:
    - What they require only a standard phsysical space conditions regardless psychological aspects of room. There might be another aspects of psychological which is more human needs, such as renumeration or rewards. It is more likely that those other aspects (human needs) are considered to be more important for the employers rather that physical qualities of space available for them.
    - The demographic conditions might also be one factor to oversee. The majority of respondents are within the range of Middle-management positions (56.5%) and Male (55.1%), in which their concerns and expectations even higly-possibly on other aspects of psychological supports like mentioned above (renumeration and reward) other than spatial psychological concerns. It is confirmed by looking at the floorspace available for them >3.00-6.00 sqm only, but they are happy for what they physically have today.
    - Another aspect is possible related to majority of respondents are locating in the low-level office space – ranging in the 1st-3rd floor. For those occupying space in the lower level most likely would not be having negative psychological impacts towards their rooms. The glare would not be an issues, including those other factors like heating effect, stufiness, air circulation system. It is due to the use of Air-Conditioned rooms, therefore it is possible a reasons the employers feels that all related psychological aspects (heating, stuffiness and air-circulation) have been made sufficiently.
    - One factor is important to suspect for the result. The Work Productivity assessment is questioned to the respondents who might be value themselves too high or too low. The critics of the research is that research is supposed to be conducted with the Work Productivity assesed by the Superior rather than "self-assesments" toward their own work productivity. They could be unfair to assess their own level of work productivity. The indicators used to asses work productivity were employers' working aattitudes, work task ccompletion, work eefficiency, optimizing working time or time efficiency and the quality of work performance
- The two spatial assesments – physical and psychological spatial performance – have shown its positive impact to work productivity (0.033). Only floorspace and office wall materials reasons on physical spatial assesment has indicated its influenced to work productivity, while none of factors within the psychological assesment has performed its influenced to the work productivity. This result has shown while once both physical and psychological are assessed simultanously, hence the influence of physical performance to the work productivity has increased (value increased from 0.002 to 0.001).
- The Satisfaction of the employers toward their quality of workspace and the ICT available for them within the room has also highly-influenced by both Physical and Psychological Spatial Performance which is reaching the 44.3% for the Phsyical and 54.2% for the Psychological Space Performance and reaching 59.8% for both Physical and Psychological Performance. This result has indicated that employers' satisfaction of space are strongly influenced by Psychological aspects compared to physical ones. The psychological represented by variables glare (0.044) and visual privacy (0.028). It is to conclude that people like to have their workspace psychologically accepted more rather than physical one. It has been confirmed by the demographic factor which indicates that most of respondents work at >3.00-6.00 sqm only, but they are happy as long as psychologically conditions are accepted for them, such as the requirements on controlling the glare, heating conditions, freshness and air circulations and humidity within the rooms. The Privacy was also found mostly good. Therefore, they feels fine with all their psychological needs of rooms.
- The Coping behavior made by the employers are significantly impacted by the satisfactions of employers toward their rooms (43.4% of respondents). The Coping behavior are high-influenced by the Spatial Performance. The Psychological performance are taking more influenced compared with the Physical

Spatial Performance (57.9% compared to 44.1%). The psychological aspects found significants are freshness/stufiness of rooms (0.031), air-circulation system (0.009) and Visual Privacy (0.000). Whereas other found that for the Physical performance, it was only floorspace aspect noted significantly influences the coping behavior (0.035). It means, people who feels psychologically unacceptable to their workspace, it then follows by the coping strategies. Their unsatisfactory toward their physical space has indicated not too borther them.

6. Conclusions

The paper has reported a very concised results for those academics professionals using their working space in the campus. This result is specific and can not be assumed representing of those using their work space for various or other professionals.

The research has proven that the Spatial Performance consists of Physical and Psychological Performance influences the Workproductivity and Employers' Satisfaction toward the Quality of Space and facilities within their workspace, including this Information and Communication Technology (ICT). However, Psychological Performance one has done and shown insignificantly influencing the employees' productivity. It indicates that workers tend to have a well-physical conditioned room and ignoring to what psychological aspects. Satisfaction of the employers to their quality of workspace and the ICT has also higly-influenced by both Physical and Psychological Spatial Performance. In contrast to the spatial performance underlining the Physical aspects which tend to be dominantly expected by the employers as a rooms' users, this employers' satisfaction of space are strongly influenced by Psychological aspects compared to physical ones. Therefore, employees prefer to have their workspace psychologically acceptable rather than physical ones. The Coping behavior made by the employers are significantly impacted by the Satisfactions of employers toward their rooms, in particular it is high-influenced by the Spatial Performance. The Psychological performance is taking more influencing compared with the Physical Spatial Performance, which means that once the workers feel psychologically unacceptable to their workspace, hence they will conduct so call a coping behavior .

The results of this research suggest that the future research is advised to conduct in order to oversee the work productivity in relations to the different or various profesionals. The future predicted hypotheses could be assumed that different proffesions will have different ways and different uses of space. Academic people, who are researchers or lecturers are more likely to occupy their space in longer period of time. Their values toward their workspace would be more sensible than those have different proffesion like e.q. Reporter in Media Industries, who likely spend more time outside of their workspace to do their fieldwork duties. Other research can also be developed to overlook the gender issues. It is highly possibility that there would be another findings that may result the difference between the value of space used between men and women respondents.

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