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(USBET) 2023**

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ENVIRONMENT**

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TENANT SATISFACTION LEVEL ON AIR CONDITIONING PERFORMANCE AT SHOPPING MALL

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ABSTRACT

This research endeavours to address maintenance challenges within air conditioning systems at Malaysian shopping complexes, aiming to bolster building management efficacy through a tailored maintenance management program. By conducting a comprehensive review of literature, surveys, and interviews, tenant satisfaction concerning air conditioning performance will be assessed. Discoveries will shed light on critical maintenance obstacles, failure modes, and effective strategies. The study's aspiration is to contribute to sustainable building practices by optimizing air conditioning maintenance, curbing energy consumption, and enhancing tenant comfort. The envisaged outcome encompasses a holistic maintenance management program, offering actionable steps and protocols to elevate air conditioning system performance, extend its operational life, and fulfil client requisites. This inquiry seeks to bridge the gap between maintenance protocols and tenant contentment, yielding benefits for both building management and occupants amid challenging climates. In conjunction, the study underscores how addressing hot climate air conditioning hurdles not only ensures comfort and safety but also advances sustainable, energy-efficient building operations while prioritizing demanding customers' contentment and desired performance levels.

Keywords: *air conditioning, shopping mall, tenant, satisfaction, maintenance*

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INTRODUCTION

Air conditioning is a system used to cool down the temperature in an inside space by removing the existing heat and moisture from the room. Essentially, they work by taking warm air into a system and dispersing cold air, but there is much more to this process. The main purposes of the system are to help maintain good indoor air quality (IAQ) through adequate ventilation with filtration and provide thermal comfort. HVAC systems are among the largest energy consumers in a building. Airconditioning and mechanical ventilation systems executes cooling for commercial, residential or industry buildings. Air-conditioning systems are responsible for providing fresh outdoor air to regulate the indoor contaminants such as smells from occupants' volatile organic compounds (VOC's) emitted from interior furnishings, cleaning chemicals. etc. A properly maintained and designed system will provide a continuous flow of fresh air in a building (Lee & Yoo, 2000).

Therefore, every air conditioning system is designed to be carried out either for comfort or industrial purposes. Air-conditioners designed for comfort purposes are usually found in home restaurants, hospitals, vehicles, and public transport. They function to remove discomfort of allergies and help preserve the thermal comfort of a building. It would involve examining research conducted in related fields, such as facility management, consumer behaviour, environmental psychology, or engineering, that shed light on the factors influencing tenant satisfaction with air-conditioning (Jing et al., 2021).

According to (Garg & Deshmukh, 2006) the phrase "maintenance management" is closely related to "building management." A broader definition of maintenance management keeping track of assets and parts is part of maintenance management. The goal is to guarantee that production runs smoothly and that as many minimum resources as possible are wasted. This is typically accomplished by a custom combination of software, processes, and individuals dedicated to attaining these objectives. To develop an adequate environment that encourage learning and teaching, maintenance must be undertaken wisely in the commercial building. However, the awareness of the importance of the building performance in maintenance management is still very low in Malaysia. The study determines tenant satisfaction in air-conditioning performance at shopping mall. These findings provided an understanding of current of maintenance air conditioning problem at shopping complex in Malaysia to reduce the problems and improving the quality of building management systems to be more effective and fulfil the client needs and features.

Air-Conditioning Problem

The air conditioning problems at shopping malls can have significant effects on both tenants and customers. Some of the potential impacts include discomfort, where poorly functioning air conditioning systems can result in an uncomfortable shopping environment, which can drive away customers and negatively impact the reputation of the mall. Besides, air conditioning problems can also impact tenant satisfaction and lead to higher turnover rates and difficulty attracting new tenants. Therefore, it can lead to decreased sales, where inadequate cooling can make shopping an unpleasant experience and reduce the amount of time customers spend in the mall, leading to lower sales and revenue for both the mall and its tenants. Other than that, health concerns lead to poor indoor air quality and exposure to high temperatures can pose a health risk for shoppers and employees, which can result in legal and financial liabilities for the mall. It also can cause loss of business reputation, which the air conditioning problems can create a negative image for the mall, damaging its reputation and reducing customer loyalty. Lastly, it may increase the maintenance costs where the need for frequent repairs and maintenance can increase the operating costs of the mall, impacting its profitability (Omara & Abuelnour, 2019).

According to (Chowa & Fungo, 1995) mention in the article that shopping malls commonly face several problems with their air conditioning systems, some of which firstly is poor air quality. Shopping malls are bustling spaces with a constant flow of people, which leads to the accumulation of dust, dirt, and other pollutants within the air conditioning systems. If these contaminants are not effectively filtered out, they can circulate throughout the mall, potentially causing respiratory issues, allergies, and other health problems for both shoppers and employees. Regular maintenance and cleaning of the air conditioning units, including filter replacements and duct cleaning, are crucial to ensure good air quality within the mall.

METHODOLOGY

The purpose of this method is the commonly used and straightforward option for analysing quantitative data. To achieve the stated objectives of this research, the following method has been conducted. Therefore, site observation throughout the case study is conducted to obtain the quantitative data.

Literature Research

Literature review is a research method related to the identification and evaluation that may be referred those responsible from researchers, academics and practitioners who have been recorded.

Site Observation

The observation inspection is conducted to obtain an overview of the information on the structure based on literature review.

Case Study

Angsana Ipoh Mall, formerly known as Greentown Mall, is a friendly neighbourhood mall in the heart of Ipoh City Centre, surrounded by offices, government complexes, colleges, and a hospital. Popular among local shoppers especially, it has a 343 thousand square feet gross built-up area, built in the 1990s with a vibrant design and practical layout.

Sample Size

According to (Gómez et al., 2004) supports the link between satisfaction and profitability. They find that nearly 40 respondents agree that customers satisfaction can increase the profitability. Since, evidence supports the link between satisfaction and profitability, shopping mall management should plan a good strategy to improve their quality if they intend to target them (occupant) as part of the overall marketing strategy. The respondent derived throughout the survey at shopping mall. However, there are some areas that are not allowed to do a survey such as their office management area.

ANALYSIS

These are structured sets of questions designed to gather information from individuals or groups. Questionnaires can be administered in person, by mail, online, or through telephone interviews. The instrument is an online survey type that involves distributing questionnaires using social networking sites.

Business

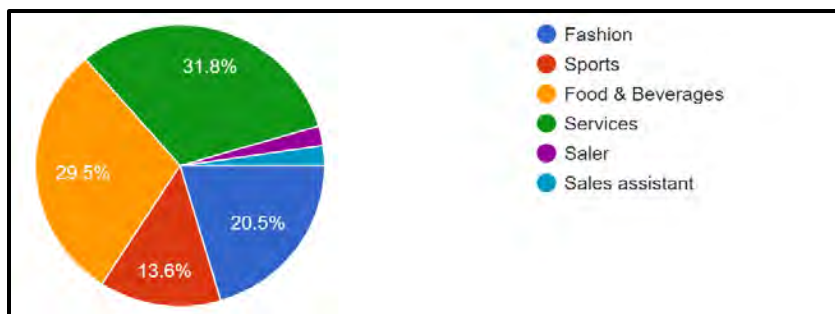


Figure 1: Type of Business

Figure 1 show the fashion industry represents 20.5% of the businesses, indicating a notable presence in the market. Sports-related businesses, accounting for 13.6%, occupy a relatively smaller portion of the market, including sporting goods stores, fitness centres, and sports equipment manufacturers. The food and beverages sector emerge as the largest category with 29.5%, represent fast food restaurants such as MarryBrown, Kentucky Fried Chicken (KFC) etc. Services businesses capture a significant 31.8% of the market, encompassing a wide range of service-based enterprises, such as beauty salons, jewellery, and healthcare providers.

Satisfied with The Management

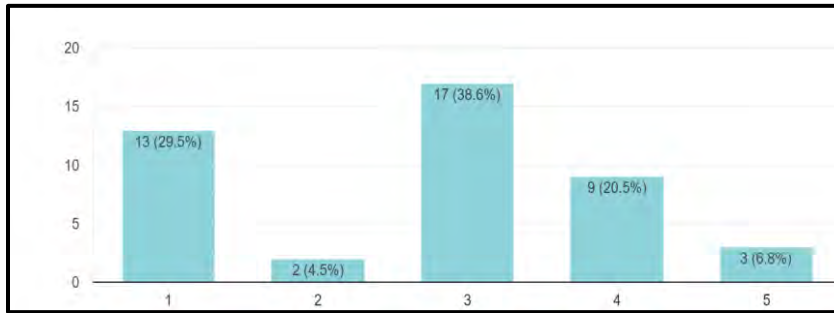


Figure 2: Tenant Satisfaction

Figure 2 show a substantial portion of respondents, 29.5%, strongly disagree with the management, indicating a significant level of dissatisfaction. This highlights the presence of critical concerns or issues among this group of individuals. Additionally, 4.5% of respondents disagree, further demonstrating a negative sentiment towards the management. On the other hand, a larger portion of respondents, 38.6%, express a neutral stance, suggesting a lack of strong positive or negative opinions about the management. This could imply that these individuals may not have noticeable experiences or strong feelings towards the management. Conversely, 20.5% of respondents agree and 6.8% strongly agree with the management, indicating a group of individuals who express satisfaction and positive perceptions.

Air Conditioning Satisfaction

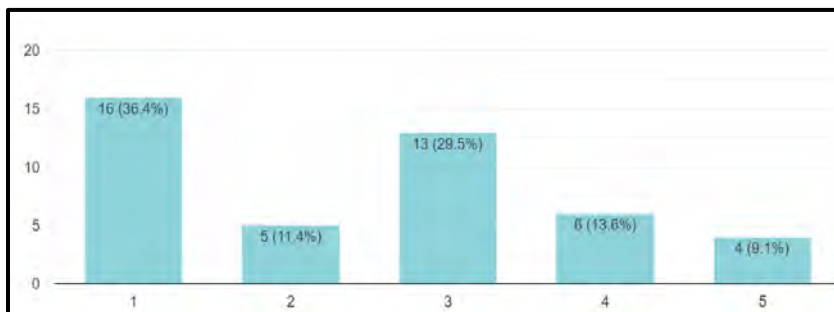


Figure 3: Air Conditioning Satisfaction

Figure 3 show a significant proportion of respondents, 36.4%, strongly disagree with the air-conditioning system, indicating a high level of dissatisfaction. This suggests that a substantial number of individuals have experienced issues or concerns with the cooling system, potentially impacting their comfort and overall shopping experience. Additionally, 11.4% of respondents simply disagree, further highlighting a negative sentiment towards the air-conditioning system. On the other hand, 13.6% of respondents agree and 9.1% strongly agree with the air-conditioning system,

indicating a smaller but notable group of individuals who express satisfaction. Meanwhile, the largest percentage of respondents, 29.5%, remain neutral, suggesting a lack of strong positive or negative opinions regarding the cooling infrastructure.

Air Conditioning Maintenance

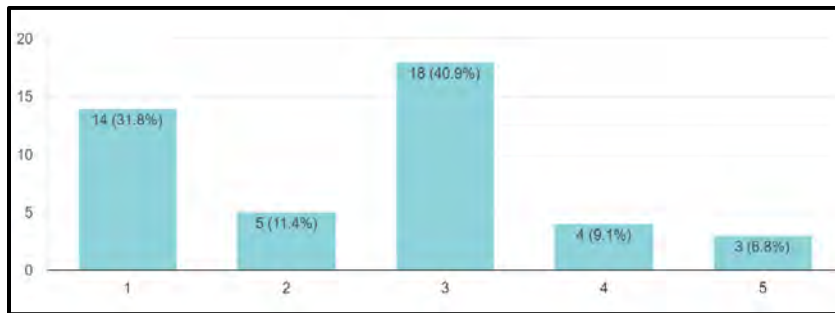
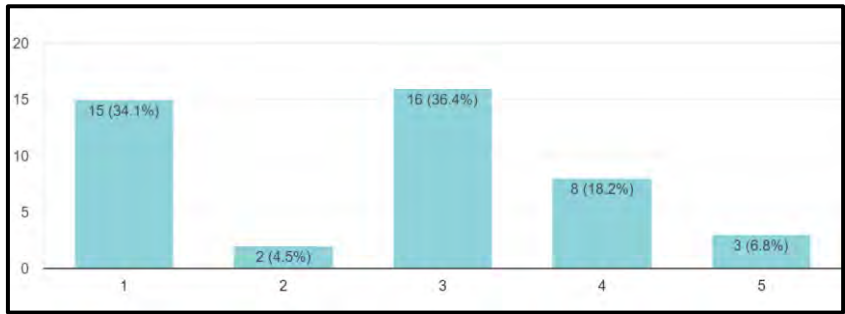


Figure 4: Air Conditioning Maintenance

Figure 4 show 31.8%, strongly disagree that maintenance is done frequently, indicating a high level of dissatisfaction with the frequency of maintenance activities. Additionally, 11.4% of respondents disagree with this statement, further supporting the notion that a considerable number of individuals feel that maintenance is not conducted frequently enough. On the other hand, 9.1% of respondents agree that maintenance is done frequently, suggesting a minority who perceive the maintenance activities to be adequate. Meanwhile, 6.8% of respondents strongly agree that maintenance is done frequently, representing a small but significant group who strongly believe that maintenance is carried out regularly. However, the largest percentage of respondents, 40.9%, express a neutral stance.

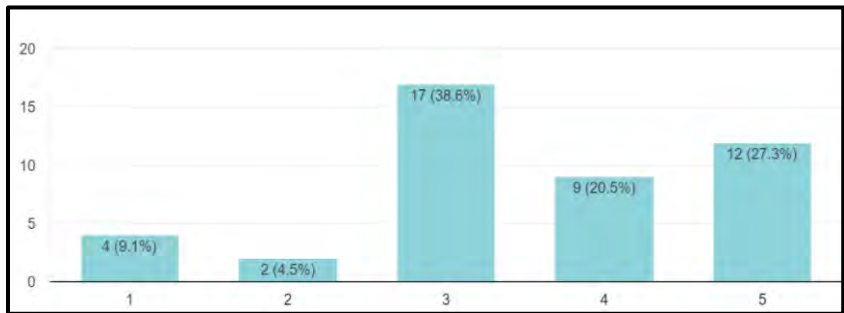
Routine Inspection

Figure 5 show 34.1%, strongly disagree that routine inspections were conducted at every shop lot, indicating a high degree of dissatisfaction or lack of confidence in the maintenance management's inspection practices. Furthermore, 4.5% of respondents disagree with the statement, supporting the notion that some individuals believe that routine inspections were not carried out adequately. The substantial percentage of respondents expressing a neutral stance, 36.4%, suggests a lack of consensus or varying experiences regarding the routine inspections. Meanwhile, 18.2% of respondents agree that routine inspections were conducted at every shop lot, suggesting a minority who have confidence in the maintenance management's efforts whereas 6.8% of respondents strongly agree to the statement.



Bar Chart 5: Routine Inspection

Maintenance Repair



Bar Chart 6: Routine Inspection

Bar chart 6 show based on the analysis data above 27.3%, strongly agree that the maintenance management took a long time for typical repair jobs to be completed, indicating a high level of dissatisfaction and frustration with the timeliness of repairs. Additionally, 20.5% of respondents agree with this sentiment, further supporting the notion that a significant number of individuals experienced delays in getting their repair jobs addressed promptly. The sizeable percentage of respondents expressing a neutral stance, 38.6%, suggests a lack of consensus or varying experiences regarding the timeliness of repairs. While 4.5% and 9.1% respectively, disagree and strongly disagree, indicating a minority who did not perceive significant delays in the completion of repair jobs.

DISCUSSION

The outcome of this research shows that most of the businesses run in Angsana mall are services such as gadget shops, shoe repair, pharmacy etc. Most of the workers who answered this survey are those who work for 8 hours a day starting at 10 am until 6 pm. They experienced the temperature inside the mall during the day, which the temperature during day is hotter than the night. The data gathered have provide insight on overall satisfaction with the management of the shopping mall. It shows that the management did not do the maintenance frequently at each of the shop lot. Percentage on each bar chart represent level satisfaction of the tenants at the shopping mall. This could imply that these individuals may not have noticeable experiences or strong feelings towards the management.

From data collection, it can be identified that majority of the tenant strongly agree their shop feels hot and only few of them are disagree with the statement. What can be conclude is that 15.9% of tenants is not agreed with the statement because their shops are near to the AHU room, where it makes their shop is cold than others. The AHU room controls the mall's air circulation, and if a shop is close to it, it may receive more cooled air, leading to a colder environment. To address this issue, the mall management can adjust the air distribution or temperature control system to ensure a more balanced and comfortable temperature for all shops.

What can be concluded from the data collection is that maintenance is not done even if there is a complaint from the tenant, the damage will be left to linger until it causes major damage. Due to these issues, the mall often faces problems related to air conditioner breakdown and thus affect the comfort of customers. Therefore, it is indirectly affecting their sales. This is more serious when this problem occurs during peak seasons such as fasting months, Raya, and public holidays because the mall is a focal point for people to find essential goods during any celebration. For that reason, 34.1% of respondent are agreeing to suggest them to do a preventive maintenance system to the mall because the management take a longer time to complete a typical job at certain shop lot. The data shows 44.2% of the respondent strongly agree that the improvement of maintenance in a shopping mall can increase the sales throughout the year. This indicates a recognition among a significant portion of respondents that well maintained facilities and a clean environment have a positive impact on business performance. When maintenance is improved, it creates a pleasant shopping experience, attracts more customers, and encourages them to spend more time in the mall. It also demonstrates a commitment to customer

satisfaction and can foster tenant loyalty. Prioritizing regular maintenance practices can lead to increased sales and a positive perception of the mall.

CONCLUSION & RECOMMENDATION

To be conclude, based on the statement that maintenance for the air conditioning system at the shopping mall is only performed a few times a year, it may be determined that the system's maintenance management programme is infrequent and likely reactive. The limited amount of maintenance shows a possible resource allocation that prioritises cost savings over system performance and dependability. This technique, however, may raise the chance of system failures, decreased efficiency, and increased energy usage. To improve overall maintenance effectiveness, mall management should consider implementing a more comprehensive maintenance strategy that includes regular preventive maintenance, allowing proactive identification and resolution of potential issues, thereby improving system performance, reliability, and energy efficiency.

Based on the statement, it can be concluded that there are some tenants in the shopping mall who are dissatisfied with the air-conditioning performance and maintenance conducted by the mall management. The dissatisfaction is significant enough to have an impact on the tenants' sales, suggesting that the air-conditioning issues may be affecting their business operations. The dissatisfaction with maintenance implies that the management's maintenance efforts may be insufficient or ineffective in addressing the air-conditioning problems faced by the tenants. This could include issues such as inadequate cooling, inconsistent temperature control, frequent breakdowns, or delays in addressing reported problems. The negative impact on sales further emphasizes the importance of maintaining a comfortable and conducive environment within the shopping mall. Inadequate air-conditioning performance can lead to discomfort for shoppers, potentially discouraging them from spending time and money in the mall, thus impacting the tenants' businesses.

Therefore, practical strategies to improve comfort and pleasure in the shopping mall environment are suggested. Prioritising strong maintenance practises, performing frequent air conditioning unit inspections, optimising air circulation through well-designed AHU rooms, providing clean indoor air quality with monitoring systems, and maintaining appropriate temperature and humidity levels are all important tasks. Actively collecting feedback from tenants and customers improves system operation. By implementing these techniques, the mall will be able to create a welcoming environment, promote occupant well-being, and eventually drive tenant and consumer happiness, resulting in improved business performance. These initiatives highlight the importance of regular maintenance in establishing an effective and pleasant shopping experience.

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