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DETERMINATION OF BARRIERS ON THE TECHNOLOGY ADOPTION AMONG CONTRACTORS IN MALAYSIA

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ABSTRACT

The decision making process of technology adoption is critical if one attempts to improve the present situation. It is generally accepted that construction is a risk-averse industry when it comes to new methods. Therefore, the objective of this research to determine barriers on the technology adoption implementation among contractor. However, construction workers have the belief that those who do not perform activities directly on the job site do not grasp the nature of the profession. As a result, there is a pervasive aversion to change and technology in the workplace and the construction industry continues to be a barrier to technology adoption. The research employs a quantitative method involving the distribution of a questionnaire survey among selected contractor company at construction companies in Kinta, Perak, Malaysia. The response rate was 98% from the sample size of 107. The findings indicated that the most significant aspect for the contractor companies is allocating funds for employee training to effectively embrace the use of new technology. In conclusion, embracing technology in the construction industry can significantly facilitate construction work and ensure smoother project execution. Overcoming the aversion to change and fostering a culture of technological openness will pave the way for progress and innovation in the construction sector.

Keywords: *barriers, technology adaption, contractors, Malaysia*

INTRODUCTION

Understanding the decision making process of technology adoption is critical if one attempts to improve the present situation. It is generally accepted that construction is a risk-averse industry when it comes to new methods.Companies prefer to”buy into” a technology only after it has already been successfully used by another company, especially a competitor. Furthermore, they want claims made by vendors about improved productivity, safety and/or reduction of muda-waste tested. Vendors try to provide “convincing” information and support each node of a decision making process leading from the recognition of a need to an “in the field” assessment of an adopted technology.

Using technology to improve construction safety could increase the efficiency of safety activities and result in a safer job site. In the construction industry the use of technology, is becoming essential in fields of engineering, construction planning and control, cost control and financial planning, computer-aided facilities management, and others, offering a variety of opportunities for more productive and efficient project implementation within the sector (Moshood et. Al,2020) .However, construction workers have the belief that those who do not perform activities directly on the job site do not grasp the nature of the profession

The hurdles also include significant operating, maintenance, and training expenditures. Along with financial obstacles, there are also difficulties relating to people, such as a lack of motivation and qualified workers. Innovative innovations are also badly impacted by technical issues such a lack of integrity, durability, and dependability. Additionally, difficulties on the building site and adjustments to the management process have an impact on how technology is used.(Arabshahi et al., 2021)

Since many current executives in the construction business did not grow up with technological gadgets, they are often hesitant to adopt new technologies. It's crucial that your managed IT service provider also provide the assistance and instruction required to "up-skill" each user and teach them how to use technology to enhance business operations. When done correctly, this will also increase productivity and staff morale.Cultural resistance to adopting green energy technologies as opposed to traditional technologies, a lack of skilled professionals and labour, a lack of professional interest in adopting technologies (Iqbal et al., 2021).

Economic constraints include unpredictable returns and a protracted payback time, an unstable economic climate, a large initial investment required to adopt technologies, the absence of financial instruments such as bank loans, and a shortage of resources. Investing new infrastructure costs a lot of money and can tie up key resources. Surprise charges, however, can force the contractor's hand if they are using outdated equipment and crossing their fingers that nothing fails. The

unstable economic environment is a critical issue towards the adoption of the technologies in construction projects because this barrier promotes less interest from customers. Iqbal et al.,(2021) stated that, one major obstacle to the adoption of new technology in construction projects is their high initial investment costs.

Organizational impediments include a lack of technological knowledge, workshops, training, top leadership support, a lack of a performance evaluation system, a lack of stakeholder communication, and a lack of rewards. Lack of employee workshops, inadequate training, and lack of understanding of SETs are major barriers that prevent the use of new technology in construction projects, according to Luthra, Kumar, Garg, and Haleem (2015). Any organization's senior management has a crucial role to play in promoting the use of green technology. Unfortunately, senior management in developing nations, like Pakistan, lacks the motivation and support needed to encourage staff to use cutting-edge technologies like sustainable energy technology (SETs) in building projects rather than more traditional ones.Because of this, a lack of support from top management has been seen as a major obstacle to the adoption of technology (Nguyen et al., 2017). To increase adoption, senior leadership must encourage middle managers and lower-level managers.The performance of equipment in construction projects has been negatively impacted by a significant barrier known as a lack of performance measuring systems.

The absence of locally produced technology, a lack of technology adoption-related advertising, a lack of consumer demand, inconsistent definitions and assessments of sustainable technologies, and a lack of suppliers are the main categories of market obstacles (Iqbal et al., 2021). Energy-efficient technology are imported from wealthy nations at a significant expense to the developing world. Therefore, a major problem that prevents the deployment of technologies in building projects is the dearth of manufacturing companies producing cutting-edge technologies in the local market.

Governmental obstacles include a lack of funding and subsidies, a lack of interest on the part of the government, a lack of government-sponsored promotion, a lack of government-sponsored legislation, and a lack of government involvement in the research and development conducted by educational institutions.According to Qian and Chan (2010), the government has not implemented laws that are effective in regulating the deployment of energy-saving technologies in the building sector. As the objective of the research which to determine the barriers of technology adoption among contractors in Malaysia, all the problem statement are listed to ensure that the barrieres are spotted.

METHODOLOGY

In this research, there method of collecting the data is quantitative method. The data collected through questionnaires which have been adapted from the previous study. The population of construction companies located in Kinta, Perak is 176 firms listed on the website of CIDB. The questionnaire distributed to among randomly selected construction companies. The sample size was calculated using Raosoft calculator with margin error of 5%, confidence level of 90% and a 50% response distribution. As a result,the research sample size is 107. The total of questionnaires sent were 107 numbers since the population size of construction companies in Kinta, Perak. However, only 105 numbers of respondent respond back to the questionnaire where the percentage of the respond rate was 98%. The construction companies have been choose by using simple random sampling method. The questionnaire was then be analysed using descriptive statistics analysis data using Statically Package for Social Science (SPSS) software. SPSS software used to summarize the data and the findings.

FINDING AND DISCUSSION

Through the questionnaire surveys, the findings on barriers of technology adoption were tabulated in Table 1.

Table 1: Descriptive statistic for barriers of technology adoption

	N	Mean	Interpretation	Ranking
Company need to spend money on employees training to adapt the use of new technology.	105	4.50	Strongly agree	1
Culture of the construction industry is one of the barriers.	105	3.67	Agree	2
Using traditional methods is faster than using the technology in the construction industry.	105	2.84	Neutral	3
Using traditional methods is easier than using the technology in the construction industry.	105	2.32	Disagree	4

The use of technology in the company for a project is not beneficial .	105	1.70	Strongly disagree	5

According to Table 1, the majority of respondents strongly agreed that the company need to spend money on employees training to adapt the use of new technology . As a response to this question, 73 out of 105 respondents (69.5%) said that they strongly agreed upon this variable. Following that, 19 respondents (18.1%) selected agreed as their feedback, 9 respondents (8.6%) selected neutral, 3 respondent (2.9%) chose strongly disagreed, and 1 respondent (1%) disagreed as their feedback. This variable has a mean score of 4.50. Thus, the majority of those who responded said they strongly agreed that the company need to spend money on employees training to adapt the use of new technology. Regona et al,. (2022) stated that, there is no denying the advantages AI could have on a building site. However, in order to acquire accurate data, AI technologies require high upfront costs.

As shown on Table 1, the majority of respondents agreed that the Culture of the construction industry is one of the barriers . As a response to this question, 69 out of 105 respondents (65.7%) said that they agreed upon this variable. Following that, 16 respondents (15.2%) selected neutral as their feedback, 10 respondents (9.5%) selected strongly agreed, 9 respondents (8.6%) chose strongly disagreed, and 1 respondent (1%) disagreed as their feedback. This variable has a mean score of 3.67. Thus, the majority of those who responded said they agreed that the culture of the construction industry is one of the barriers. Since they did not grow up with technological gadgets, many of today's executives in the construction industry are frequently reluctant to embrace new technologies. (Iqbal etal., 2019)

Lastly, Table 1 shows that the use of technology in the company for a project is not beneficial. As a response to this question, 75 out of 105 respondents (62.9%) said that they strongly disagree upon this variable. Following that, 8 respondents (7.6%) each selected disagree and agree as their feedback, and 7 respondents (6.7%) from each selected strongly disagreed and neutral as their feedback. This variable has a mean score of 1.70. Thus, the majority of those who responded said they strongly disagreed that the use of technology in the company for a project is not beneficial. Complex technological requirements to obtain is challenging due to the complexity of the infrastructure (Reyes-Veras et al.,2021).There is no question that a technology's requirements and investment cost have a significant impact on how it is implemented.

CONCLUSION

The findings of this research have conclusively demonstrated that technology adoption among contractors in the construction industry has ignited an enduring impact that will significantly shape the future of these contractors. This research assists to highlight the paramount importance of technology adoption within the construction industry, ensuring that contractors become fully aware of its benefits and transformative potential. Another crucial aspect of the research to establish effective strategies for integrating available technologies into the construction sector, thereby optimizing their adoption process. Hence, by embracing technology in the construction realm, contractors have the opportunity to elevate their companies to new levels of efficiency and productivity.

In conclusion, the incorporation of technology in the construction industry is undeniably advantageous, facilitating construction work and improving overall industry performance. Despite some contractors' comfort with traditional methods, the implementation of available technologies can ensure smoother project execution. However, it is essential to address and resolve any issues identified during the research objectives, ensuring that the potential benefits are fully realized. The comprehensive analysis and results derived from the study provide valuable insights into this transformative journey.

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