



الجامعة  
UNIVERSITI  
TEKNOLOGI  
MARA



# PROCEEDINGS OF JOHOR INTERNATIONAL INNOVATION INVENTION COMPETITION AND SYMPOSIUM 2024 (JIICaS 2024)



*“Flourish and Nurturing Sustainable  
Innovation for a Prosperous Nation”*

# Editorial Board

## **Editors**

**NUR INTAN SYAFINAZ AHAMD**

**DR. HAJAH NORBAITI TUKIMAN**

**DR. NUR IDAYU ALIMON**

**AHMAD KHUDZAIRI KHALID**

**DR. MOHAMAD FAIZAL AB JABAL**

**DR. WAN MUNIRAH WAN MOHAMAD**

**DR. NUR SYAMILAH ARIFFIN**

**AZYAN YUSRA KAPI@KAHBI**

**NURHAZIRAH MOHAMAD YUNOS**

**NORZARINA JOHARI**

**AISHAH MAHAT**

**AZRINA SUHAIMI**

**HARSHIDA HASMY**

**DR. NG SET FOONG**

**FOO FONG YENG**

**Copyright © 2024 Universiti Teknologi MARA Cawangan Johor, Kampus Pasir Gudang, Jalan Purnama, Bandar Seri Alam, 81750 Masai Johor.**

**All extended abstracts published in this e-book have not been subject to JIIICaS2024 peer review or check. The authors are responsible for the contents of their extended abstracts and warrant that their extended abstract is original, has not been previously published, and has not been simultaneously submitted elsewhere. The views expressed in the abstracts in this publication are those of the individual authors and are not necessarily shared by the editor.**

**All rights reserved. No part of this publication may be reproduced in any form or by electronic or mechanical means, including information storage and retrieval systems, or transmitted in any form or by any means, without the prior permission in writing from the Course Coordinator of College of Computing, Informatics and Mathematics, Universiti Teknologi MARA Cawangan Johor, Kampus Pasir Gudang.**

**e ISBN: 978-967-0033-25-9**



**Published in Malaysia by  
Universiti Teknologi MARA Cawangan Johor  
Kampus Pasir Gudang  
81750 Masai**



## **Preface**

**In the name of Allah, the Almighty who gives us the enlightenment, the truth, the knowledge and with regards to Prophet Muhammad (peace be upon him) for guiding us to the straight path. We thank to Allah for giving us guidance and strength to write this e-book.**

**This e-book compiles the extended abstracts that submitted to Johor International Innovation Invention Competition and Symposium 2024 (JIIICaS2024), where JIIICaS2024 is a virtual platform for all creative minds to share and present their invention and innovation. Each abstract gives a brief background on the innovation or project.**

**We hope that this e-book will help the readers to get to know the innovation done by the students and get some ideas to develop future innovation products.**

## Foreword Rector



Assalamualaikum warahmatullahi Wabarakatuh,  
Salam Sejahtera, Salam Malaysia MADANI and  
Salam UiTM Dihatiku.

In the name of Allah, the Most Gracious, the Most  
Merciful.

It is a great honor to welcome you to the Johor  
International Innovation, Invention, Competition, and  
Symposium 2024 (JIICaS 2024). This event

connects various disciplines, focusing on education and engaging educators,  
students, researchers, and innovators from all walks of life.

Innovation is not just about ideas; it demands perseverance, creativity, and  
determination to turn those ideas into reality. The remarkable projects  
showcased today highlight the dedication and spirit of all participants.  
Initiatives like this not only explore new technologies but also cultivate skills  
and leadership among our youth. At Universiti Teknologi MARA (UiTM) Johor  
Branch, we are fully committed to fostering a dynamic culture of innovation,  
promoting the commercialization of new products, and encouraging  
meaningful collaborations with industry and society.

As we celebrate this event, I would like to extend my heartfelt gratitude to all  
sponsors, judges, the College of Computing, Informatics and Mathematics,  
UiTM Pasir Gudang Campus as the event organizer, as well as to the  
researchers and participants for their hard work in making this event a  
success. Let us continue striving for innovation and excellence. May the  
ideas presented today inspire us and lay the groundwork for future  
achievements.

Thank you.

**Associate Professor Dr. Saunah Zainon**  
**Rector**  
**Universiti Teknologi MARA (UiTM)**  
**Johor Branch**

## **(A-ST094) DIGITALIZATION ADOPTION IN THE CONSTRUCTION INDUSTRY IN MALAYSIA: THE WAY FORWARD**

NUR IDZNI BINTI ABDUL GHAFUR  
NASRUDDIN BIN FAISOL

### **ABSTRACT**

This study explores the impact of digitalization on the construction industry as well as focusing on factors influencing and limiting its adoption. The research methodology involves a quantitative method utilizing a questionnaire as the primary research instrument to gather data from stakeholders in the construction industry, including developers, design teams, contractors, and subcontractors. The study's findings have shown that the current state of digitalization in the Malaysian construction industry is highly adopted and highlight key factors influencing and limiting its adoption. The implications of this research include recommendations for industry players to address resistance to new technologies through continuous learning initiatives, tailored training programs, and improved communication and collaboration using digitalization. This study also provides valuable insight for stakeholders, policymakers, and researchers to promote digitalization in the construction industry, emphasize well-targeted government initiatives, and collaborate to drive digital transformation.

Keywords: Digitalization, Digital technologies, Building information modelling, Internet of Things, Construction, Malaysia.

### **1. INTRODUCTION**

Digitalization is changing the construction industry by improving design, building, and management processes. While many sectors have quickly adopted digital transformation, construction has been slower. "Digitization" means converting things to digital format, like turning old drawings into digital files (Lok et al., 2023). The construction sector is one of the least digitized industries (Koch et al., 2019). Digitalization has greatly impacted routine construction tasks by providing better access to information and faster communication ((Lee et al., 2021).

Using digital technology in construction helps with maintenance operations and overcomes limitations of traditional systems (Mannino et al., 2021). Digitalization is key to making construction more efficient (Pedral Sampaio et al., 2023). Construction organizations are essential for delivering and managing infrastructures accurately throughout their lifecycles. However, they have been slower to adopt digitalization compared to other industries, especially during the pandemic (Siccardi & Villa, 2023). This study examines the important role of technology adoption in transforming construction practices.

### **2. OBJECTIVE**

1. To study current state of digitalization in construction organization in Malaysia.

2. To investigate the factors that influence a rise in digitalization in construction organization in Malaysia.
3. To determine the factors that limit a rise in digitalization in construction organization in Malaysia.

### **3. METHODOLOGY**

A questionnaire survey was developed, and a pilot study was conducted to test the suitability of the questionnaire questions. Using an online questionnaire survey, it was sent to construction organizations consisting of both public and private sector organizations. A total of 146 construction organizations responded to the questionnaire survey. These included housing developers, contractors, architects, quantity surveyors, engineers, and subcontractors. All questionnaires were analyzed using SPSS software by conducting a compare means analysis between respondent groups. Factors with the highest means were ranked at the top, while factors with the lowest means were ranked at the bottom. This ranking system indicates which factors are important and which are not important in this study. Only some findings are reported here.

### **4. RESULT**

The study analyzes the current state of digitalization in the construction industry by examining various demographics such as sector, organization type, organization size, and years of experience. It finds that digitalization is widely adopted at personal, organizational, and project levels, with high means across different sectors and organization types. Key factors influencing digitalization include communication, collaboration, and high efficiency, while high demand by clients, advancements in technology, and government initiatives are seen as less influential. Conversely, resistance to new technologies, hesitation, and limited financial resources are major barriers, with insufficient training opportunities being less significant. Overall, the findings highlight a high demand by clients, advancements in technology, and government initiatives are typically considered potential drivers for digitalization, the data suggests that in the construction industry, particularly in Malaysia, these factors are not as influential.

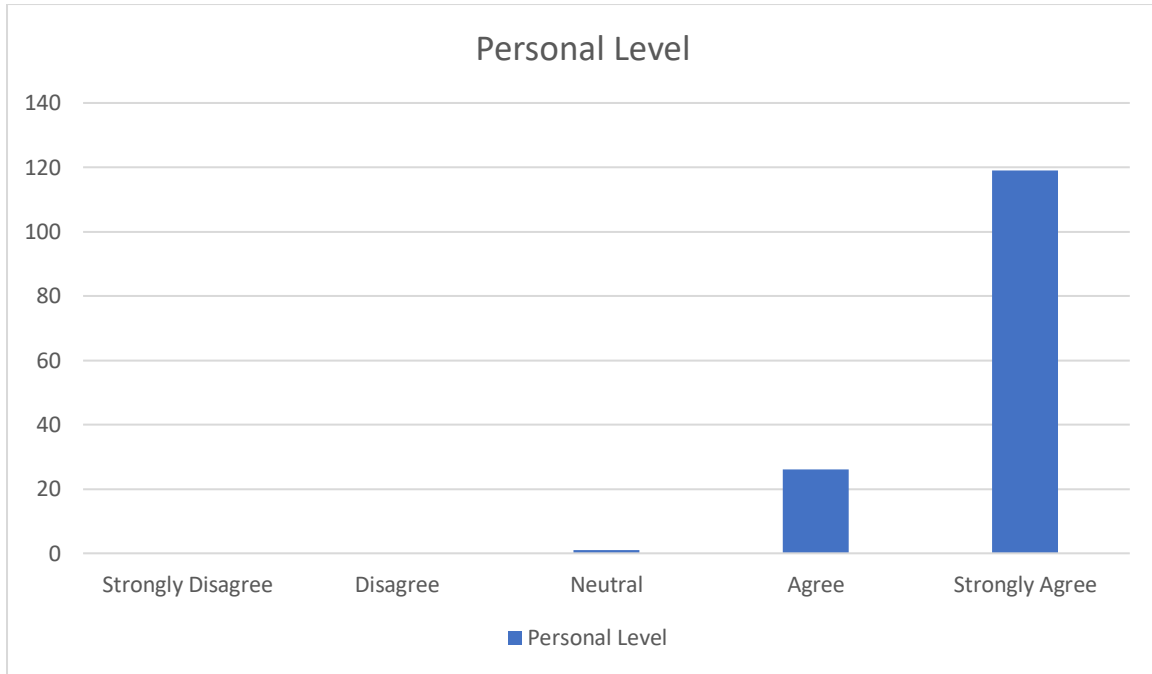


Figure 1: Current state of digitalization in personal level

Table 1: Factor influencing the rise of digitalization in construction (by type of sector)

	Overall		Private		Public	
	Mean	$\sigma$	Mean	$\sigma$	Mean	$\sigma$
High demand by client	2.76	1.88	2.93	1.89	2.13	1.71
Advancement in Technology	2.62	1.82	2.81	1.84	1.90	1.60
Government Initiatives	1.95	1.55	1.98	1.53	1.84	1.61

## 5. CONCLUSION AND WAY FORWARD

1. The findings reveal that digitalization is widely adopted, with communication, collaboration, and efficiency being key drivers, although cost constraints, reluctance to change, and inadequate government initiatives pose challenges.
2. This result also shows that digitalization adoption is more focused on the trend of usage for aspects of communication and collaboration, but not necessarily on the digitalization needs as required by clients, due to advancements in technology and government initiatives.
3. The steps that need to be taken by organizations in the workplace or by the government are to raise awareness that the use of digitalization must aim to increase productivity at the personal, organizational, and governmental levels.

## References

- Koch, C., Hansen, G. K., & Jacobsen, K. (2019). Missed opportunities: two case studies of digitalization of FM in hospitals. *Facilities*, 37(7/8), 381–394. <https://doi.org/10.1108/F-01-2018-0014>
- Lee, J. Y., Irisboev, I. O., & Ryu, Y. S. (2021). Literature review on digitalization in facilities management and facilities management performance measurement: Contribution of industry 4.0 in the global era. *Sustainability (Switzerland)*, 13(23). <https://doi.org/10.3390/su132313432>
- Lok, K. L., van der Pool, I., Smith, A. J., Opoku, A., & Cheung, K. L. (2023). Sustainable digitalisation and implementation of ISO standards for facilities management. *Facilities*, 41(5/6), 434–453. <https://doi.org/10.1108/F-03-2022-0038>
- Mannino, A., Dejaco, M. C., & Re Cecconi, F. (2021). Building Information Modelling and Internet of Things. Integration for Facility Management - Literature Review and Future Needs. *Applied Sciences (Switzerland)*, 11(7). <https://doi.org/10.3390/app11073062>
- Pedral Sampaio, R., Aguiar Costa, A., & Flores-Colen, I. (2023). A discussion of digital transition impact on facility management of hospital buildings. *Facilities*, 41(5/6), 389–406. <https://doi.org/10.1108/F-07-2022-0092>
- Siccardi, S., & Villa, V. (2023). Trends in Adopting BIM, IoT and DT for Facility Management: A Scientometric Analysis and Keyword Co-Occurrence Network Review. *Buildings*, 13(1). <https://doi.org/10.3390/buildings13010015>