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Unlocking Employee Agility Through Digital Competency and Empowerment

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ABSTRACT

The main objective of this paper is to explore the relationship between digital competency and employee agility and the moderation effect of employee empowerment among administrators in Malaysian public universities. A quantitative methodology using PLS-SEM analysis conducted on 310 responses collected through the distribution of survey questions using Google Form. Digital competency (Information and data literacy, communication and collaboration, digital content creation, safety and problem solving) were found to have a positive significant relationship with employee agility. As a moderator, employee empowerment was found to strengthen the relationship between information and data literacy and employee agility. However, employee empowerment was not found to strengthen the relationship between communication and collaboration, digital content creation, safety and problem solving and employee agility. This research addressed the gap due to the limited study on employee agility and digital competency. Malaysian public universities leaders should leverage on digital competency in improving digital competence among administrators and focus on the targeted competence area of digital competency. The research also extending the Person-Environment Fit theory as well as creating new insights for Malaysian public universities leaders to leverage on digital competency, employee agility and employee empowerment.

1. Introduction

In the era of rapid technological advancement and digital transformation, employee agility has emerged as a crucial capability for organizations seeking resilience and sustained competitiveness. Digital competency, the ability of employees to effectively use digital tools and technologies has been identified as a key driver for employee agility. However, the extent to which this relationship is strengthened or weakened by employee empowerment remains underexplored. One such micro-level skill set is digital competency, employees' ability to confidently select, combine and exploit digital tools to accomplish work tasks. Empirical studies across sectors show that higher information-technology or digital competency enhances employee's agility (Han Lai et al., 2021; Wijaya et al., 2024). Conceptual syntheses of recent literature likewise position digital competence as a cornerstone of individual and organisational agility (Subariyanti et al., 2025).

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Research on employee empowerment suggests that empowered staff translate resources into agile behaviours more effectively because they feel authorised to experiment and take rapid decisions. Psychological-empowerment studies report significant direct effects on employee agility and show that empowerment can strengthen other antecedents of agility (Hanifah & Wicaksana, 2023; Amanda et al., 2023). Nevertheless, the moderating role of empowerment in the digital competency–agility link has received scant empirical scrutiny. Early evidence focuses on empowerment as a mediator of digital transformation and performance (Muneer et al., 2024) rather than as a boundary condition shaping agility outcomes.

Although prior work consistently indicates that digital competency enhances employee agility, the strength of this relationship varies across contexts and samples. Empowerment theory predicts that digitally competent employees will behave agilely only when they also perceive discretion and impact; otherwise, their skills may remain latent. Yet extant studies have treated empowerment mainly as a direct predictor or mediator, leaving its moderating influence on the digital competency–agility nexus largely unexplored (Hanifah & Wicaksana, 2023). Digital tools are only as effective as the employee's ability to apply them dynamically in real-time problem-solving, decision-making, and collaboration. In this regard, employee empowerment is essential. Yet, despite this recognition, many organizations still lack insight into how employee empowerment acts as a catalyst in this relationship—whether it amplifies the effect of digital competency on employee agility, and under what circumstances it is most effective.

2. Literature Review

2.1 Person-Environment Fit Theory

The concept of Person–Environment (P-E) fit emerged from the interactionist perspective in psychology (Kaplan, 1950) and was further developed by vocational psychologists such as Dawis and Lofquist (1964) and Holland (1959), who examined the alignment between individual characteristics and work environments. Person-environment (P-E) fit theory posits that positive outcomes ensue for both organisations and individuals when they are in harmony. Person-Environment (P-E) fit is a comprehensive framework that incorporates a multitude of environmental considerations and various types of alignment. Complementary and supplementary forms of fit are included in person-environment fit (Cable & Edwards, 2004; Edwards & Shipp, 2007). There are numerous correlations between P-E fit and behavioural and attitude outcomes, according to studies. The relationships between environmental factors, the conceptualization of fit, and the measuring techniques employed in the research exhibit variation (Hoffman & Woehr, 2006; Kristof-Brown et al., 2005; Verquer et al., 2003).

Recent studies highlight that the effectiveness of digital competence in the workplace depends strongly on person–organization (P–O) fit. For example, Bian, Wang, Li, and Du (2025) demonstrated that the relationship between employees' digital competence and ethical decision-making during digital transformation is significantly shaped by the organizational ethical climate, underscoring the importance of P–O fit in digitally evolving environments. Similarly, research in public service organizations shows that digital competence directly improves service quality and performance when aligned with organizational digitalization goals (SA Journal of Human Resource Management, 2024).

In education, P–E fit has been operationalized through validated digital competence frameworks for both teachers and students. Vaino et al. (2023) developed a reliable scale to assess teachers' digital competence, while Tejada-Gomez et al. (2024) created an instrument for higher education students. These tools enable the "person" side of the fit equation to be empirically measured and tested against outcomes such as teaching quality, student engagement, and persistence (Kutscher et al., 2025). At the same time, environmental demands are increasingly institutionalized through policy initiatives such as the European Union's Digital Education Action Plan 2021–2027 (European Commission, 2021) and the evolving DigComp framework (Joint Research Centre, 2025), which articulate expected levels of digital competence for both education professionals and learners. Furthermore, public management studies confirm that P–O fit is positively associated with innovative work behaviour and job performance, providing additional

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pathways through which digital competence can contribute to organizational effectiveness in the public sector (Zhou et al., 2024). Taken together, these findings validate P–E fit as a robust theoretical lens to examine the intersection between digital competence, organizational climate, and performance outcomes in contemporary education and government contexts. Organisations and their employees share a symbiotic connection. Swift responsiveness and adaptability of personnel are essential for improving organisational effectiveness in response to changes. Person-Environment fit theory posits that the alignment between an employee and their work environment is essential for achieving organisational objectives and improving individual and organisational effectiveness. This is consistent with the theory. This study aims to investigate how digital competency affects employee agility.

2.2 Employee Agility

Employee agility is increasingly recognized as a multidimensional capability essential for organizations navigating volatile, uncertain, complex, and ambiguous (VUCA) environments. Conceptually, it encompasses three interrelated dimensions: proactivity, adaptability, and resilience. Proactivity refers to anticipating and initiating change before it becomes urgent; adaptability involves adjusting behaviours, skills, and strategies to meet evolving demands; and resilience captures the capacity to recover and sustain performance following disruptions (Muduli et al., 2023; Snyder & Brewer, 2019). Systematic reviews published in 2024 emphasize that workforce agility is a distinct yet malleable construct, shaped by both individual and organizational factors, such as learning climate, HRM practices, and cultural values. However, these reviews also identify limitations in current knowledge, including the predominance of cross-sectional research designs, the underrepresentation of public sector samples, and a need for multilevel studies linking organizational agility with individual outcomes (Wijaya et al., 2024).

Within higher education and the public sector, employee agility is particularly salient as institutions confront accelerating digital transformation, governance reforms, and workforce restructuring. Evidence suggests that when employees perceive their organizations as agile and when leadership balances stability with flexibility, they are more likely to exhibit higher engagement, stronger change readiness, and greater intention to remain (Ahmad et al., 2023; Subariyanti et al., 2025). These findings underscore the importance of cultivating agility in Malaysian public universities, where rigid governance structures often constrain employee discretion (Yusof & Hassan, 2022). Furthermore, research highlights that psychological empowerment—characterized by meaning, competence, self-determination, and impact—acts as a critical antecedent of employee agility. Empowered employees are more willing and able to act proactively, adapt to technological disruptions, and sustain resilience in uncertain environments (Hanifah & Wicaksana, 2023; Amanda et al., 2023). This reinforces the rationale for examining empowerment as a boundary condition in models linking digital competency to agility, particularly in bureaucratic and knowledge-intensive contexts such as higher education.

2.3 Digital Competency

Digital competency has emerged as a key construct in education and workforce development, encompassing the knowledge, skills, and attitudes required to effectively use digital technologies in academic, professional, and social contexts. While earlier scholarship often equated digital skills with basic ICT literacy, contemporary research emphasizes a more holistic understanding that integrates technical, cognitive, social, and ethical dimensions of technology use (Ilomaki et al., 2019; Spante et al., 2018). In higher education, digital competency is now regarded as an essential graduate attribute that directly influences students' learning outcomes, employability, and capacity for lifelong learning (Castaneda et al., 2021). A range of frameworks have been developed to conceptualize and assess digital competence, with the European Commission's Digital Competence Framework for Citizens (DigComp) providing one of the most widely adopted references. The DigComp 2.1 version (Carretero et al., 2017) outlined five competence areas—information and data literacy, communication and collaboration, digital content creation, safety, and problem solving—together with eight proficiency levels, enabling fine-grained measurement of digital

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abilities. This structure provided a scalable model to assess digital skills across educational, professional, and lifelong learning contexts.

DigComp 2.1 has been adopted as a benchmark for digital skills in higher education. Gonzalez-Calatayud et al. (2021) applied the framework to measure the digital competence of university students in Spain, finding that while students demonstrated proficiency in communication and collaboration, they showed weaker performance in content creation and safety domains. Likewise, Ilomaki et al. (2019) argued that DigComp 2.1 was particularly valuable for higher education institutions because it bridged the gap between policy frameworks and pedagogical practice by providing clear descriptors of digital proficiency that can be operationalized in course design and graduate employability strategies. Moreover, DigComp 2.1 has also been used in comparative and cross-cultural studies. For instance, Cabero-Almenara and Palacios-Rodriguez (2020) adapted the framework to analyze digital competence among pre-service teachers across different European contexts, concluding that DigComp 2.1 allowed for standardized measurement across national systems. This adaptability made the framework a reference point not only in European higher education but also internationally, particularly in studies that examined digital competence in developing countries (Castaneda et al., 2021).

Recent studies have further validated DigComp 2.1 in non-Western contexts. Abubakari et al. (2023) tested the structural validity of the framework among university students in Brunei and confirmed its psychometric reliability through confirmatory factor analysis. Their findings underscore its adaptability across diverse educational systems. Likewise, a gender-focused study in Uganda employed DigComp 2.1 to examine digital competence differences between male and female students. Results indicated only marginal and statistically insignificant gender gaps, suggesting that the framework can be effectively applied to investigate equity dimensions in higher education (Nakatumba-Nabende et al., 2023).

2.3.1 Information and Data Literacy

In the era of digital transformation, information and data literacy (IDL) has emerged as a critical competence for students, educators, and professionals in higher education. IDL is not only about the ability to search, evaluate, and use information effectively, but also about understanding data practices, ethical use, and digital citizenship in a knowledge-driven society (Vuorikari, Kluzer, & Punie, 2022). Recent studies emphasize that IDL is a key enabler of employability and lifelong learning, particularly as universities transition toward more data-intensive and technology-enabled environments (Jamaludin & Mahmud, 2024; Scholten, Wessels, & Faber, 2024). Empirical evidence suggests that information and data literacy contributes significantly to academic performance and student outcomes. Jamaludin, Yusof, and Ismail (2025) found a positive correlation between digital competence and academic performance among Malaysian undergraduates, underscoring the need for targeted interventions in IDL training. Similarly, immersive and innovative approaches, such as data storytelling and the use of virtual reality, have been shown to strengthen student engagement with data-driven learning tasks (Li, Zhang, & Chen, 2024; Shao, Li, & Deng, 2024).

Beyond learning outcomes, IDL is also central to developing ethical awareness in relation to information use, privacy, and responsible data management. Projects across Southeast Asia have demonstrated the importance of embedding information and media literacy in university curricula to address issues of misinformation, digital trust, and governance (Rahim & Ghazali, 2023; Jamaludin & Mahmud, 2024). Furthermore, the growing role of data stewards in universities signals the institutionalization of IDL as an essential part of research governance and academic integrity frameworks (Scholten et al., 2024).

2.3.2 Communication and Collaboration

Communication and collaboration are increasingly recognized as essential competencies in higher education and organizational contexts, particularly in an era defined by digital transformation and global interconnectedness. In universities, effective communication practices underpin teamwork, knowledge

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exchange, and academic performance, while collaboration fosters innovation and collective problem-solving (Nguyen et al., 2021). Recent studies emphasize the integration of digital communication tools, such as learning management systems, collaborative applications, and virtual platforms, as catalysts for improving academic collaboration and organizational productivity (Benson & Morgan, 2023). In higher education, collaborative pedagogies—such as project-based learning and interdisciplinary research—enhance students' teamwork skills, digital collaboration competencies, and adaptability to complex professional environments (Lopez & Heredia, 2022). Moreover, communication and collaboration are central to institutional governance. In public sector and higher education governance, transparent communication with stakeholders, coupled with collaborative decision-making, strengthens accountability and organizational trust (Ali & Ismail, 2023). Effective collaboration across governance units—such as audit, integrity, and legal services—reduces silos and ensures more coherent policy implementation (Salleh et al., 2024). From a workforce perspective, collaborative leadership and open communication channels also support employee engagement, innovation, and institutional resilience in times of uncertainty (Nguyen et al., 2021).

2.3.3 Digital Content Creation

Digital content creation has become a crucial competency in the era of digital transformation, particularly within the public sector and education. The ability to design, adapt, and disseminate digital content not only enhances knowledge sharing but also strengthens institutional agility by enabling faster responses to emerging challenges (Vuorikari et al., 2022). In higher education, digital content creation competencies empower educators and administrators to deliver innovative pedagogies, promote flexible learning environments, and foster engagement among digitally native learners (Rapanta et al., 2020). Within the public sector, employees who are proficient in digital content creation can quickly develop training modules, communication materials, and e-learning resources to meet evolving stakeholder needs (Ahmad et al., 2023). Such competencies are particularly relevant in times of crisis, as evidenced during the COVID-19 pandemic when educational institutions worldwide relied on rapid development of digital content to ensure continuity of teaching and governance (Rapanta et al., 2020; Al-Samarraie, 2022).

2.3.4 Safety

The safety dimension of the Digital Competence Framework (DigComp 2.1) encompasses the ability to protect devices, personal data, privacy, health, and the environment in digital environments (Carretero et al., 2017). In education and the public sector, digital safety has become a strategic competency that not only ensures secure use of technology but also enhances institutional agility and resilience in the face of rapid digital transformation. Within DigComp 2.1, the safety area includes competencies such as protecting digital devices, safeguarding personal data and privacy, promoting digital well-being, and addressing environmental sustainability in technology use. These aspects align with broader conceptualizations of digital competency as an evolving capacity that integrates technical, cognitive, ethical, and social dimensions (Castaneda et al., 2021). For staff and students in higher education, as well as employees in the public sector, safety is a foundational skill that underpins responsible participation in digital ecosystems. In the public sector, digital safety is directly linked to organizational agility, the capacity to adapt quickly and effectively to change. Employees with strong digital safety competencies are better prepared to manage risks associated with cyberthreats, data breaches, and misinformation, which are increasingly common in government and educational institutions (Fitsilis et al., 2024). Recent studies argue that digital safety contributes to institutional resilience by fostering trust, transparency, and accountability in digital services (Abubakari et al., 2023). For instance, public universities that prioritize staff and student training in data protection and cybersecurity are more agile in adopting cloud services, online learning platforms, and open data practices while maintaining compliance with regulatory frameworks.

2.3.5 Problem Solving

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The problem-solving dimension of DigComp 2.1emphasizes the ability to identify digital needs, solve technical issues, innovate with digital tools, and continuously update one's competencies (Carretero et al., 2017). In contemporary education and the public sector, problem solving is a dynamic digital skill that enhances adaptability, organizational agility, and lifelong learning for both staff and students. Problem solving is central to digital competency because it reflects the adaptive use of technology in complex, evolving contexts. Rather than focusing solely on technical proficiency, this competence highlights the need to critically select tools, apply innovative strategies, and collaborate effectively in digital environments (Vuorikari et al., 2022). In education, problem solving enables students to become active learners who use digital tools to research, create, and communicate knowledge. For staff, it supports the design of innovative teaching practices, effective administrative processes, and efficient problem resolution in digitally mediated environments (Garcia-Holgado et al., 2021).

3 Theoretical Framework

3.1 Digital Competency and Employee Agility

The growing digitalization of the public sector requires employees not only to possess baseline digital literacy but also to demonstrate agility in responding to technological, organizational, and societal changes. Digital competency, as defined by frameworks such as DigComp 2.1 extends beyond technical skills to encompass problem solving, safety, information management, and communication in digital environments (Vuorikari et al., 2022). These competencies serve as the foundation for employee agility, enabling staff to rapidly adapt their work practices, embrace innovation, and sustain productivity in uncertain contexts. Employee agility is generally understood as the ability to adapt quickly to change, learn continuously, and innovate in response to evolving challenges (Muduli et al., 2023). In the public sector, where digital transformation is often accelerated by policy reforms, crises, or citizen demands, digital competency becomes a prerequisite for agile behaviours. For example, employees who are proficient in digital collaboration tools, data management systems, and cybersecurity practices are better able to transition between tasks, adopt new platforms, and respond to emergencies such as the shift to remote work during the COVID-19 pandemic (Nguyen et al., 2021).

The relationship between digital competency and agility directly affects organizational performance in the public sector. Studies show that digitally competent employees contribute to organizational resilience, particularly in areas such as e-governance, online service delivery, and digital innovation (Fitsilis et al., 2024). By leveraging digital skills, employees can identify opportunities for streamlining processes, engage in cross-departmental collaboration, and implement innovative solutions that improve efficiency and transparency. This adaptability enhances the public sector's ability to meet citizen expectations while maintaining accountability and trust. Hence, composing from the results aforementioned, a hypothesis is developed:

H1:Information and data literacy has a positive relationship with employee agility
H2:Communication and collaboration has a positive relationship with employee agility
H3:Digital content creation has a positive relationship with employee agility
H4:Safety has a positive relationship with employee agility
H5:Problem solving has a positive relationship with employee agility

3.2 Employee Empowerment as Moderator

Employee empowerment has become an increasingly important construct in contemporary organizational research, particularly in the context of public sector transformation and education. Empowerment refers to granting employees greater autonomy, decision-making capacity, and access to resources, thereby enabling them to perform their roles with greater ownership and responsibility (Hanifah & Wicaksana, 2024). In the public sector, where bureaucratic hierarchies and rigid procedures often hinder

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flexibility, empowerment is recognized as a catalyst for organizational agility (Wicaksana, Amanda, & Hanifah, 2024).

Agility, defined as the ability of individuals and organizations to respond swiftly and effectively to environmental changes, is critical in ensuring service quality, policy responsiveness, and institutional resilience (Muduli et al., 2021). Empowered employees are better positioned to act proactively, adapt to technological disruptions, and innovate in their work processes. This is especially relevant in higher education, where universities must rapidly adapt to changes in digital learning, accreditation requirements, and governance expectations.

Recent empirical studies confirm the strong relationship between empowerment and agility. Wicaksana, Amanda, and Hanifah (2024) showed that psychological empowerment explained 53.9% of the variance in workforce agility in a public sector organization, highlighting empowerment as a key predictor of adaptive capacity. Similarly, Hanifah and Wicaksana (2024) found that empowerment acts as a moderator, amplifying the positive influence of work engagement on agility. This means that employees who are both engaged and empowered are more likely to demonstrate resilience, flexibility, and creative problem-solving in the face of uncertainty.

These findings are supported by research in broader organizational contexts. For instance, Muduli et al. (2021) demonstrated that empowerment significantly enhances workforce agility by fostering proactive behaviours and innovative problem-solving. Similarly, Naseer and Ahmad (2023) emphasized that empowerment practices in public institutions enhance employee adaptability and responsiveness, which are crucial in navigating administrative reforms and policy changes. In the education sector, empowering lecturers and administrative staff allows institutions to respond effectively to digitalization demands, student expectations, and evolving governance requirements (Ibrahim & Jaafar, 2023). Therefore, this study proposes to examine the role of digital competency in moderating the relationship, hence the hypothesis:

H6:Employee empowerment has a positive significant relationship with Employee Agility.

H7:Employee empowerment strengthens the relationship between information and data literacy and employee agility.

H8:Employee empowerment strengthens the relationship between communication and collaboration and employee agility.

H9:Employee empowerment strengthens the relationship between digital content creation and employee agility.

H10:Employee empowerment strengthens the relationship between safety and employee agility.

H11:Employee empowerment strengthens the relationship between problem solving and employee agility.

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Deriving from the hypotheses above, a conceptual framework (Figure 1) is formed.

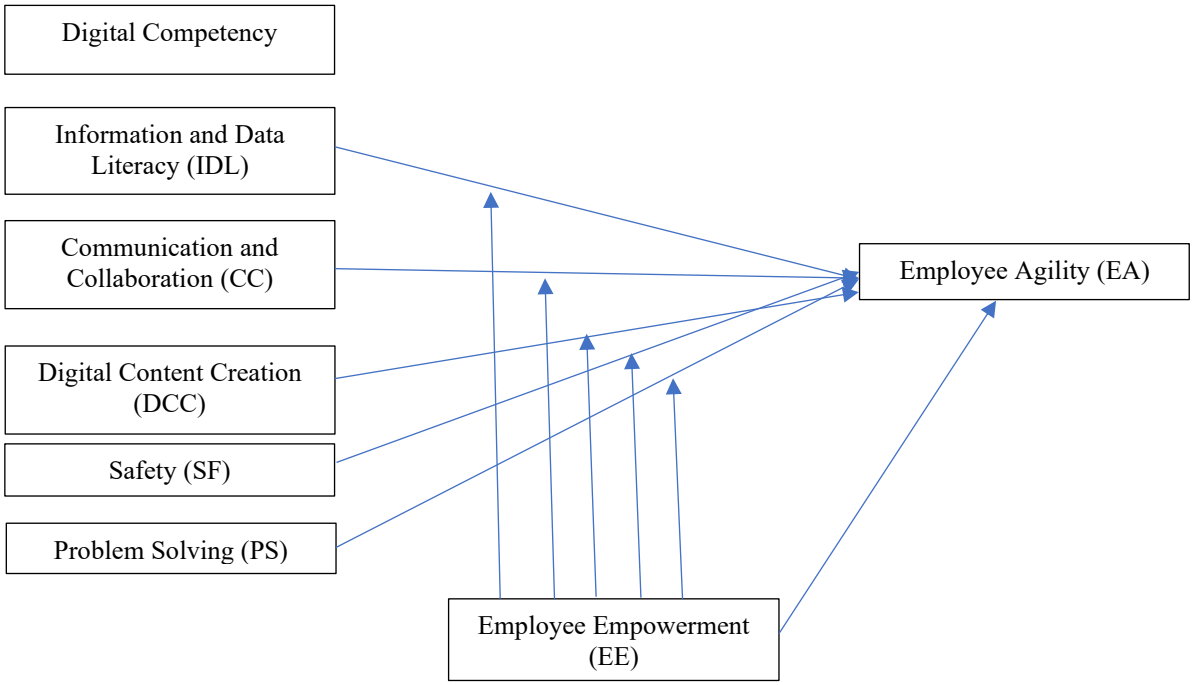

Figure 1: Proposed Research Model

4 Methodology

4.1 Sample and Procedure

The sample size of this study is determined using purposive sampling with several inclusion criteria: Administrative officer (Scheme N), in grade 41 until 54, Management and Professional Group (Non-Academic) of 20 Malaysian public universities. This study conducted a power analysis test using G*Power software to find that the sample size for this study is 160 respondents. A questionnaire was sent via mail to the administrative officers, as per the list provided by the Registrar Office of the Malaysian public universities. A total of 2383 surveys were issued to the administrative officers of 20 Malaysian public universities via electronic mail using the Google Form Survey. The researcher obtained 325 responses, resulting in a useable response rate of 13% or 310 responses.

4.2 Measures

The adopted questionnaire consisted of two parts: demographic details and the main survey section. The first section collects details on age, gender, years of working experience, and educational background. The second segment uses a Likert scale to measure; 5-point scale for DigComp 2.1(Carretero,S., Vuorikari,R., & Punie,Y., 2017) to measure digital competency, employee agility (Muduli, 2017) and employee empowerment (Baird, K., Tung, A., & Su, S., 2020) ranging from strongly disagree to strongly agree. Prior to mass distribution via online channels, the instruments were first pilot-tested using Cronbach's Alpha to measure the internal consistency.

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Table 1: Questionnaire Development Table

Section	Variable	No. of Item
1	Digital competency	21
2	Employee agility	7
3	Employee empowerment	4
	Total	32

5 Findings

5.1 Demographic Information

The data obtained were first prepared using SPSS 29.0 and then computed accordingly. Table 2 shows the respondents demographic profile. The result showed that 59.7% of the respondents were male and 40.3% respondents were female. The majority of respondents were from 40-49 years (52.6%) and followed by 30-39 years (30%), 20-29 years (13.2%) and above 50 years (4.2%). The level of education attained by most of the respondents who participated in the study was Bachelor Degree (87.7%) as compared to Master Degree (12.3%). In terms of position grade, 48.1% of them was N44 grade, followed by N41 grade 41.6%, N48 grade 8.1%, N52 grade 1.6% and N54 grade 0.6%. For working experience, 36.1% were 11-15 years, followed by 26.5% 6-10 years, 17.4% 16-20 years, 16.8% below 5 years and 3.2% above 20 years.

Table 2: Respondent's Demographic Profile

Demographic	Frequency	Percentage
Gender		
Male	185	59.7
Female	125	40.3
Age		
20-29 years old	41	13.2
30-39 years old	93	30
40-49 years old	163	52.6
50 years old and above	13	4.2
Education		
Degree	272	87.7
Master and above	38	12.3
Grade		
N41	129	41.6
N44	149	48.1
N48	25	8.1
N52	5	1.6
N54	2	0.6
Experience		
Below 5 years	52	16.8
6-10 years	82	26.5
11-15 years	112	36.1
16-20 years	54	17.4
Above 20 years	10	3.2

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5.2 Mean and Standard Deviation

Table 3: Mean and standard deviation of the study variables

Variables	Mean	Std. Deviation
Information and data literacy	3.5097	0.72039
Communication and collaboration	3.5043	0.58152
Digital content creation	3.4145	0.52289
Safety	3.4556	0.52085
Problem solving	3.2847	0.54324
Employee empowerment	2.8089	0.61531
Employee agility	4.2028	0.59551

5.3 Measurement Model

Prior to assessing the model, a full collinearity analysis was conducted to assess the existence of Common Method Bias due to the single-sourced data (Kock, 2017). As a result, variance inflation factors (VIF) derived from the test were below the value of 3.3, hence there was no collinearity issue (Table 4) (Kock & Lynn, 2012).

Table 4: Full Collinearity Test

Variables	VIF
Digital competency	
Information and data literacy	3.001
Communication and collaboration	1.423
Digital content creation	1.814
Safety	2.077
Problem solving	1.566
Employee agility	
Employee empowerment	2.614

As for the convergent validity, Hair et al. (2017) proposed to examine the average variance extracted (AVE) for each variable where the values should be more than 0.50 and the outer loadings should exceed 0.708, so that the squared value of the outer loadings should not be less than 50 percent of the variance. Using SmartPLS 4.1.1.2 the items constructs exceeded the expectations (Table 5).

Table 5: Measurement Model for Constructs

Construct	Item	Loading	CR	AVE
Communication and collaboration	**CC1**	0.890	0.965	0.822
	CC2	0.884		
	CC3	0.892		
	CC4	0.895		
	CC5	0.954		
	CC6	0.924		
Digital content creation	**DCC1**	0.955	0.978	0.918
	DCC2	0.960		
	DCC3	0.958		
	DCC4	0.960		
Employee agility	**EA1**	0.886	0.958	0.764
	EA2	0.866		
	EA3	0.898		

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	EA4	0.893		
	EA5	0.897		
	EA6	0.855		
	EA7	0.818		
Employee empowerment	**EE1**	0.916	0.953	0.835
	EE2	0.922		
	EE3	0.917		
	EE4	0.900		
Information and data literacy	**IDL1**	0.934	0.954	0.873
	IDL2	0.934		
	IDL3	0.935		
Problem solving	**PS1**	0.907	0.955	0.840
	PS2	0.912		
	PS3	0.923		
	PS4	0.924		
Safety	**SF1**	0.934	0.964	0.872
	SF2	0.936		
	SF3	0.929		
	SF4	0.936		

The assessment of Heterotrait-Monotrait ratio of correlations (HTMT) was used to assess the discriminant validity where the indicators were checked, should they overlap each other (Table 6). The value should not exceed 0.85 (Henseler et al., 2015).

Table 6: HTMT between Constructs

	CC	**DCC**	**EA**	**EE**	**IDL**	**PS**	**SF**	**EE x DCC**	**EE x PS**	**EE x SF**	**EE x CC**	**EE x IDL**
CC												
DCC	0.238											
EA	0.448	0.567										
EE	0.345	0.522	0.736									
IDL	0.282	0.268	0.521	0.646								
PS	0.300	0.298	0.555	0.369	0.317							
SF	0.116	0.195	0.522	0.608	0.607	0.298						
EE x DCC	0.261	0.608	0.616	0.521	0.269	0.505	0.290					
EE x PS	0.287	0.496	0.591	0.459	0.310	0.550	0.331	0.644				
EE x SF	0.215	0.308	0.535	0.575	0.588	0.358	0.640	0.343	0.510			
EE x CC	0.503	0.242	0.432	0.430	0.273	0.270	0.188	0.354	0.434	0.253		
EE x IDL	0.307	0.281	0.477	0.584	0.783	0.330	0.580	0.337	0.506	0.706	0.466	

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5.4 Assessment of Model

In the assessment of the model, Hair et al. (2019) suggested to report several criteria such as collinearity assessment, path coefficients, R^2 value, f^2 value, Q^2 value, and PLSPredict. Through the complete bootstrapping process with 5,000 subsamples and 95% confidence interval, the path coefficients, the standard errors, t-values and p-values were then reported as in Table 7 (Ramayah et al., 2018, p. 291). The R^2 value, also known as the coefficient determination is 0.668, indicating this model has a moderate predictive power (Hair et al., 2017). The next step is to examine the f^2 value, commonly known as the effect size or Cohen's Indicator (Sheko & Spaho, 2018). Thus, in this study, the effect size for the direct relationship between digital competency and employee agility are as follows: Information and data literacy, 0.021, communication and collaboration, 0.051, digital content creation, 0.041, safety, 0.031 and problem solving, 0.049 and the effect size for the hypothesized relationship between employee empowerment and employee agility is 0.087. The moderated relationship revealed the effect size of information and data literacy and employee agility is 0.039, indicating effect.

Table 7: Asessment of the Structural Model

Hypothesis	Relationships	Standardized Beta	Standard Errors	t-value	p-value	f^2	Decision
H1	IDL-EA	0.143	0.071	2.005	0.045	0.021	Supported
H2	CC-EA	0.152	0.052	2.891	0.004	0.051	Supported
H3	DCC-EA	0.154	0.047	3.283	0.001	0.041	Supported
H4	SF-EA	0.145	0.052	2.806	0.005	0.031	Supported
H5	PS-EA	0.157	0.035	4.526	0.000	0.049	Supported
H6	EE-EA	0.270	0.076	3.543	0.000	0.087	Supported

Table 8: Hypothesis of Moderating Effect

Hypothesis	Relationships	Standardized Beta	Standard Errors	t-value	p-value	f^2	Decision
H7	EE-IDL-EA	0.164	0.070	2.355	0.019	0.039	Supported
H8	EE-CC-EA	-0.049	0.046	1.071	0.284	0.010	Not Supported
H9	EE-DCC-EA	-0.077	0.047	1.635	0.102	0.017	Not Supported
H10	EE-SF-EA	-0.079	0.054	1.463	0.143	0.014	Not Supported
H11	EE-PS-EA	-0.080	0.046	1.724	0.085	0.017	Not Supported

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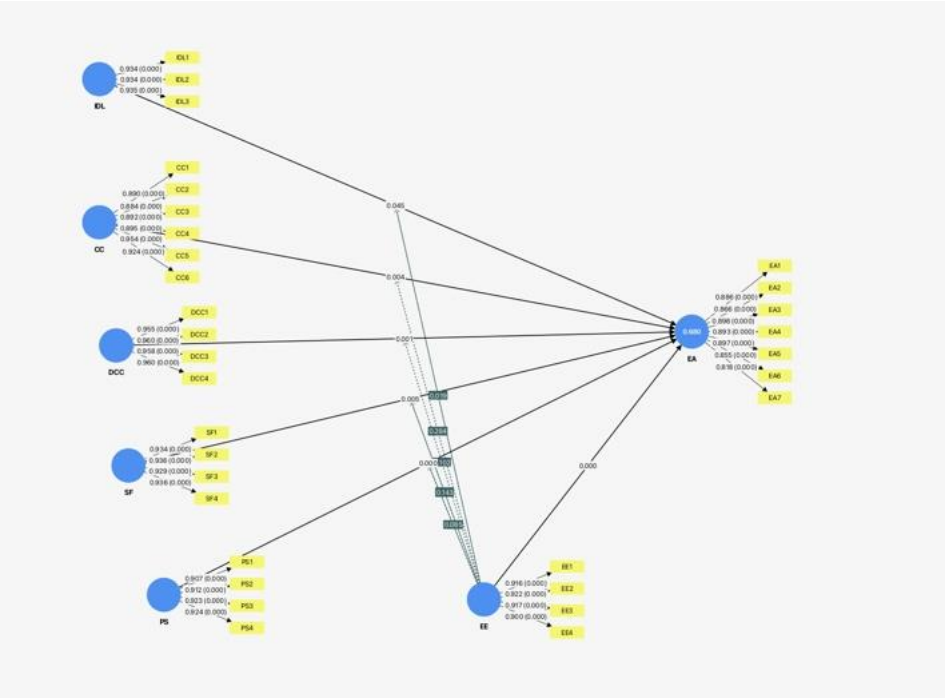

Figure 2: Bootstrapped Model

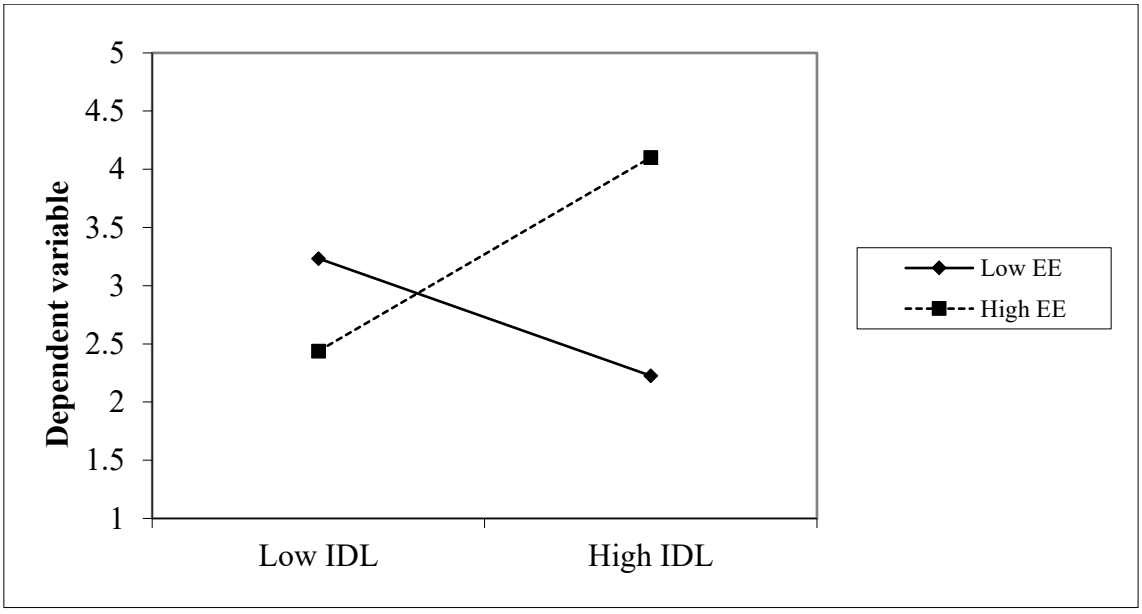

Figure 3 : Interaction plot for Information and Data Literacy and Employee Empowerment

Acknowledge that the Q^2 procedure may not be sufficient for prediction, Shmueli et al. (2019) proposed to assess the model using the PLSPredict. In this process, holdout samples were considered in the

calculation in which the former does not include. Through SmartPLS software, the process was carried out using the setup of ten folds under ten times repetition.

Table 9: PLS-Predict

Item	PLS-RMSE	LM RMSE	Q^2predict
EA1	0.457	0.472	0.529
EA2	0.483	0.493	0.473
EA3	0.472	0.490	0.495
EA4	0.461	0.483	0.519
EA5	0.467	0.480	0.506
EA6	0.497	0.519	0.443
EA7	0.519	0.533	0.388

5.5 Discussion

This study has provided a new insight on employee agility from the perspective of Person-Environment Fit theory, through the use of digital competency. As this has been a subject less studied on especially among administrators in Malaysian public universities, this research has somewhat also filled in the gap of what could possibly be done to promote agile characteristics among administrators to face new challenges and opportunities in this VUCA world.

5.5.1 Recapitulation of Finding – Digital Competency and Employee Agility

The Relationship Between Digital Competency (Information and Data Literacy) and Employee Agility

As expected, result of this research found that digital competency namely information and data Literacy is positively related to employee agility with ß = 0.143, t-value = 2.005. Therefore, H1 is accepted. In DigComp 2.1, this dimension involves browsing, evaluating, and managing digital content (Carretero et al., 2017). Recent initiatives, such as the DaLI project, highlight the need for structured data literacy models in higher education to strengthen staff capabilities in analyzing and disseminating data (Echtenbruck et al., 2025; Fitsilis et al., 2024). Strong data literacy enables administrators to make informed decisions, enhance adaptability, and respond to institutional challenges. Empirical studies show that digital competence fosters technology adoption (Kabakuş et al., 2023) and innovative work behaviours in universities (Galanti et al., 2024), while also underpinning workforce adaptability and organisational agility (Le et al., 2024). Thus, information and data literacy is foundational to agility, equipping higher education staff to navigate complex digital environments and adapt to evolving demands.

The Relationship Between Digital Competency (Communication and Collaboration) and Employee Agility

It was discovered that communication and collaboration had a substantial influence on employee agility. The analysis revealed a coefficient (ß) of 0.152 and a t-value of 2.891. Therefore, H2 is accepted. The communication and collaboration dimension of DigComp 2.1 encompasses skills related to engaging, sharing, participating in digital citizenship, collaborating through digital tools, adhering to netiquette, and managing one's digital identity (Carretero et al., 2017). In the context of Malaysian public universities, these competencies are increasingly critical as administrators must not only ensure effective interdepartmental coordination but also engage with industry partners, students, and other external

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stakeholders in a rapidly evolving digital landscape. Proficiency in digital communication and collaboration enhances the ability of university administrators to adapt to digital transformation and manage complex institutional challenges. Recent studies have highlighted that collaborative technologies significantly improve responsiveness and teamwork. For example, Pahayahay (2025) demonstrated that Google Workspace tools support real-time communication and collaboration in academic environments, thereby strengthening organisational agility. Similarly, empirical evidence shows that social media platforms in higher education facilitate knowledge acquisition, sharing, and iterative collaboration, which are essential for effective problem-solving and agility in knowledge-intensive teamwork (Heliyon, 2024). At a broader organisational level, digital communication and collaboration are also linked to leadership and innovation practices that underpin agility. Bux et al. (2025) emphasised that transformational leadership, when combined with digital collaboration and knowledge-sharing practices, enhances organisational agility by enabling open innovation and adaptability in higher education institutions. These findings suggest that the mastery of digital communication and collaboration competencies equips administrators with the capacity to proactively coordinate, engage across organisational boundaries, and respond flexibly to dynamic challenges. In sum, digital communication and collaboration skills are not only fundamental to sustaining effective operations within higher education institutions but are also central to fostering employee agility, enabling administrators to remain adaptive, resilient, and responsive in an era of digital transformation.

The Relationship Between Digital Competency (Digital Content Creation) and Employee Agility

According to the findings, the digital content creation has a significant relationship with employee agility with a ß value of 0.154 and a t-value of 3.283. Therefore, the results of H3 are statistically significant with a p-value of less than 0.05. The digital content creation dimension of the DigComp 2.1 framework encompasses the ability to develop, integrate, and modify digital content, as well as to manage copyright and licensing issues and engage in basic programming (Carretero et al., 2017). In the higher education sector, digital content creation has become increasingly critical, particularly as universities continue to adapt to post-pandemic digital transformation. Proficiency in digital content creation not only supports teaching, administration, and communication but also strengthens employees' adaptability in fast-changing environments. Recent scholarship highlights the role of digital competence in driving agility and performance in higher education institutions. For instance, digital training interventions have been shown to enhance academics' digital competence, particularly in contexts that support innovation and knowledge transfer (Emerald Insight, 2023). Similarly, studies in the public university sector confirm that digital competence positively influences employee agility, which in turn mediates service quality and performance outcomes (Wijaya et al., 2024). In addition, digital environments that encourage creativity and collaborative content production are increasingly recognized as essential for preparing staff and students with the competencies required in the era of Industry 5.0 (Pelaez-Sanchez et al., 2024). Taken together, these findings suggest that digital content creation skills provide university administrators with the capacity to design and disseminate digital resources effectively, enabling them to respond proactively to technological change. Such capabilities enhance employee agility by fostering adaptability, innovative problem-solving, and responsiveness in complex and dynamic higher education environments.

The Relationship Between Digital Competency (Safety) and Employee Agility

The results also indicated a positive correlation between safety and employee agility, with a coefficient of ß = 0.145 and a t-value of 2.806. In the DigComp 2.1 framework, the safety dimension emphasizes protecting devices, data, privacy, health, and well-being in digital environments (Carretero et al., 2017). As digital technologies are increasingly embedded in professional contexts, digital safety skills have become essential to organizational resilience. Strong safety competencies enable employees to identify, prevent, and respond effectively to cyber threats such as phishing, fraud, or data breaches, thereby supporting both individual and institutional security (Cheng et al., 2021; Katherine, 2020). For university administrators, digital safety is particularly important given their reliance on online platforms for governance,

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communication, and service delivery. Competence in this area strengthens employee agility, defined as the ability to adapt quickly to uncertainty and high-pressure scenarios. Employees who are digitally secure can maintain resilience, protect organizational credibility, and sustain continuity even during disruptive incidents (Nazir et al., 2022; Sherehiy & Karwowski, 2014). Furthermore, digital safety enhances adaptive capacity by equipping staff with the confidence to manage emerging risks and innovate under uncertainty (Van Laar et al., 2020). Without adequate awareness of safety protocols, the benefits of digital transformation remain limited, as advanced systems can be undermined by human vulnerabilities (Lazanyi & Virglerova, 2018). Thus, digital safety should be recognized not only as a technical skill but also as a strategic enabler of agility and resilience, especially in public sector institutions such as universities. Therefore, H4 offers evidence to support the notion that digital safety has a substantial influence on employee agility.

The Relationship Between Digital Competency (Problem Solving) and Employee Agility

The research revealed a substantial correlation between problem solving and employee agility, with a ß coefficient of 0.157 and a t-value of 4.526. Therefore, H5 is accepted. The problem-solving dimension of DigComp 2.1 refers to addressing technical challenges, identifying digital solutions, and creatively applying technologies (Carretero et al., 2017; Vuorikari et al., 2022). In higher education, this competency is critical for administrators who face complex organisational and technological issues. Recent studies show that digital competency enhances employee agility, which in turn mediates its impact on performance in universities (Wijaya et al., 2024). Agility in this context reflects resilience, adaptability, and proactive responsiveness when navigating uncertainty (Shet & Pereira, 2023). Thus, digital problem-solving not only supports efficient issue resolution but also fosters the agility required to thrive in dynamic institutional environments.

Recapitulation of Finding – Employee Empowerment as Moderator

The direct relationship between employee empowerment and employee agility revealed that employee empowerment also important to promote employee agility. Based on the data analysed, the result revealed a substantial correlation between employee empowerment and employee agility, with a ß coefficient of 0.270 and a t-value of 3.543. Therefore, H6 is accepted.

1. Information and Data Literacy → Employee Agility

The moderation analysis indicates that employee empowerment moderates the relationship between information and data literacy and employee agility, strengthening this linkage when empowerment is high. Information and data literacy provides employees with the ability to locate, interpret, and evaluate data critically, thereby enhancing informed and evidence-based decision-making (Data Society, 2025; van Laar et al., 2020). However, such competencies do not automatically translate into agile behaviors unless employees are empowered to act on insights. Employee empowerment creates the necessary conditions—autonomy, confidence, and psychological readiness—that enable staff to transform data-driven insights into real-time decisions and adaptive responses (Spreitzer, 2008; Al-Harthy & Ameen, 2023). In this sense, data literacy supplies the technical capacity, while empowerment provides the agency and motivation to apply these competencies effectively in dynamic contexts. Therefore, organizations, particularly in the public sector, should view agility not merely as a product of technical upskilling but as an outcome of the interaction between digital competencies and empowerment practices. By simultaneously investing in employees' information and data literacy and fostering a culture of empowerment, institutions can better prepare their workforce to adapt, innovate, and remain resilient in volatile environments (Nazir et al., 2022).

2. Communication and Collaboration → Employee Agility

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The moderation analysis showed that employee empowerment did not significantly influence the relationship between communication and collaboration and employee agility. This suggests that the positive impact of communication and collaboration on agility is driven by structural and systemic factors rather than individual discretion. Collaborative practices are often embedded in digital platforms and organizational workflows, which standardize interaction patterns and reduce reliance on autonomy (Leonardi, 2018). Furthermore, employee agility in collaborative contexts is typically mandated as part of organizational processes, making empowerment less critical. This finding aligns with Harsch and Festing (2020), who argue that in agile-oriented organizations, collaboration is facilitated by leadership and digital systems, reducing the role of empowerment as a contingency factor.

3. Digital Content Creation → Employee Agility

The absence of a moderating effect of empowerment in the relationship between digital content creation and agility may be explained by the technical and skill-dependent nature of this competency. Employees who possess advanced content creation skills can independently contribute to organizational agility through effective knowledge sharing and rapid information dissemination, regardless of perceived autonomy (European Commission, 2019). Since these tasks rely primarily on technical proficiency rather than discretionary judgment, empowerment adds little incremental value. This interpretation aligns with the Resource-Based View (Barney, 1991), which posits that skills and competencies, as strategic resources, have a direct impact on performance outcomes such as agility, even in the absence of empowering work conditions.

4. Safety → Employee Agility

Employee empowerment was also found not to moderate the relationship between safety and agility. This result is consistent with the compliance-driven nature of digital safety practices, which are typically governed by strict regulatory standards and organizational policies (ENISA, 2021). These requirements reduce the extent to which autonomy can influence safety-related behaviors, as employees are obligated to adhere to predetermined security protocols regardless of empowerment. Consequently, safety enhances agility through adherence to standards rather than discretionary initiatives, making empowerment less relevant in this context (Raghavan & Parthiban, 2014).

5. Problem-Solving → Employee Agility

Although problem-solving is generally associated with creativity and flexibility, the findings indicate that empowerment does not significantly moderate its relationship with agility. This may be due to the increasing formalization of problem-solving processes through digital tools and structured workflows (Sarker et al., 2019). Employees often operate within predefined problem-solving frameworks, which reduce reliance on personal discretion. As such, the ability to solve problems effectively and support agility is influenced more by competency and tool availability than by empowerment. This interpretation is consistent with Thomas and Velthouse's (1990) model, which suggests that empowerment has its greatest impact in contexts where discretion is high, a condition that may not apply in highly standardized digital work environments.

The finding of non-significant moderating effects between digital competency (communication and collaboration, digital content creation, safety, and problem solving) and employee agility particularly within the higher education sector it may be due to several factors. While digital competency is often associated with enhanced adaptability and responsiveness in organizational contexts (Cortellazzo et al., 2019), the translation of these competencies into agility outcomes appears to be less evident in Malaysian public universities. One plausible explanation lies in the rigid governance structures that characterize higher education institutions in Malaysia. Public universities remain heavily regulated by the Ministry of Higher

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Education (MOHE), where bureaucratic procedures, compliance mandates, and centralized approval mechanisms limit the extent to which staff can exercise autonomy in applying digital competencies for agile decision-making (MOHE, 2023).

Unlike private sector organizations, where market-driven forces often demand rapid adaptation, Malaysian public universities operate within ministry-driven frameworks that prioritize compliance and standardization over flexibility. This structural rigidity curtails the capacity of academic and administrative staff to leverage digital tools for innovative practices or responsive problem-solving, even when they possess adequate levels of digital competency. Moreover, institutional cultures rooted in hierarchical reporting lines and limited autonomy further weaken the link between competency and agility (Yusof & Hassan, 2022). For instance, initiatives such as digital learning innovations or administrative process automation often require multiple layers of approval, resulting in delays that undermine agility despite the availability of digital skills among employees.

This outcome underscores the importance of recognizing organizational context when examining the relationship between employee competencies and agility. It suggests that in higher education, particularly within the Malaysian public university system, structural and cultural barriers may dilute the potential benefits of digital competency for enhancing agility. Accordingly, digital upskilling initiatives must be complemented by governance reforms that grant universities greater institutional autonomy and encourage decentralized decision-making. Without such systemic changes, the transformative potential of digital competency for fostering employee agility may remain unrealized in this sector.

6 Conclusion

This study contributes to theory and practice by extending the Person–Environment Fit theory to the digital era, demonstrating that digital competencies—information and data literacy, communication and collaboration, digital content creation, safety, and problem solving—significantly enhance employee agility in Malaysian public universities. The findings also highlight the boundary role of employee empowerment, which strengthens the influence of information and data literacy on agility, thereby underscoring the importance of combining technical and psychological enablers in fostering agility. Despite these contributions, several limitations should be acknowledged. The study focused exclusively on administrators in Malaysian public universities, limiting generalizability to other contexts such as private institutions, non-academic staff, or international higher education systems. The reliance on cross-sectional survey data also restricts causal inference, while self-reported measures may be subject to common method bias. Future research could adopt longitudinal or mixed method designs to capture dynamic agility processes over time and triangulate perspectives across different stakeholder groups. Comparative studies across public and private universities, as well as cross-country analyses, would also enrich understanding of contextual influences. Exploring additional moderators such as leadership style, organizational culture, and governance autonomy could further illuminate the conditions under which digital competencies best translate into employee agility. By addressing these avenues, future work can build a more comprehensive understanding of how digital transformation and empowerment interact to shape agility in higher education and beyond.

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Conflict of interest statement

The authors agree that this research was conducted in the absence of any self-benefits, commercial, or financial conflicts.

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