Journal of Information and Organizational Sciences
Volume 49, Number 1 (2025)
Journal homepage: jios.foi.hr

JIOS

DOI: 10.31341/jios.49.1.2
Open Access

UDC 004:378:159.955(049.5)
Original Scientific Paper

Resilience and Self-Efficacy: Keys to Students' Change Readiness in Higher Education

Prayogo[1*], Jahju Hartanti[2], Adi Winarno[2] and Anies Listyowati[2]

[1]Postgraduate Program, PGRI Adi Buana University, Surabaya, Indonesia
[2]Faculty of Education, PGRI Adi Buana University, Surabaya, Indonesia
[*]Correspondence: prayogo@unipasby.ac.id

PAPER INFO

Paper history:
Received 28 October 2024
Accepted 23 March 2025

Citation:
Prayogo, Hartanti, J., Winarno, A. & Listyowati, A. (2025). Resilience and Self-Efficacy: Keys to Students' Change Readiness in Higher Education. In Journal of Information and Organizational Sciences, vol. 49, no. 1, pp. 15-37

ABSTRACT

This study aims to understand the influence of resilience, self-efficacy, and critical thinking on the readiness to change of final-year students, with the moderating roles of organizational culture, technological adaptation, and the mediating role of psychological empowerment in higher education. Data was gathered through an online questionnaire sent to respondents, consisting of 255 final-year students and 205 higher education members. The data was analyzed using Multi-level CFA. At the individual level, study investigates final-year students' readiness to change through resilience, self-efficacy, and critical thinking. At an organizational level, this study focuses on organizational culture, technological adaptation, and psychological empowerment. Organizational culture significantly enhances students' psychological empowerment, boosting readiness for change, as psychological empowerment is a mediator between organizational culture and readiness for change. Technological adaptation strengthens psychological empowerment, where students with higher tech proficiency show greater psychological empowerment and readiness for change. This finding underscores the value of integrating technology into education to improve learning engagement and adaptability.

Keywords: Critical thinking, Innovation, Psychological empowerment, Readiness to Change, Resilience, and Self-efficacy

1. Introduction

In the current educational landscape, developing resilience, self-efficacy, and critical thinking has become essential for preparing final-year students to adapt to rapid changes and uncertainties in academic and professional lives. Readiness for change is a crucial competency for students as they transition from academic settings into professional environments that are increasingly dynamic and complex [1]. Resilience is the capacity to withstand and recover from challenges, enabling students to face the uncertainties of their evolving roles [2]. Self-efficacy, or belief in one's ability to achieve specific outcomes, is closely linked to enhanced adaptability and engagement in the face of change [3]. Additionally, critical thinking, characterized by objective analysis and judgment, is essential for students to make informed decisions and navigate the demands of the modern workforce (Facione, 2011). Organizational culture within educational institutions is crucial in psychological empowerment and subsequent readiness for change [5]. A positive and supportive organizational culture fosters an environment where students feel empowered and capable of tackling new

challenges, improving their adaptability and resilience [6]. This study posits that organizational culture is a moderator, strengthening the relationship between resilience, self-efficacy, critical thinking, and readiness for change by enhancing students' psychological empowerment [7]. Furthermore, technological adaptation is increasingly recognized as an essential factor of psychological empowerment development, along with the skills and confidence needed to navigate digital and informational resources efficiently [8]. Integrating technology in academics encourages students to engage actively with learning materials, enhancing their preparedness for dynamic professional environments.

Psychological empowerment is a mediating factor through resilience, self-efficacy, and critical thinking to readiness for change. By feeling competent, autonomous, and impactful, students are more likely to take the initiative and engage with new challenges, thus enhancing their adaptability (Spreitzer, 1995). Technological adaptation and supportive organization are expected to increase psychological empowerment, thereby strengthening students' readiness for change for professional transitions [10]. This research seeks to expand upon previous studies by examining how organizational culture and technological adaptation as moderating factors in the relationship between core individual competencies—resilience, self-efficacy, and critical thinking—and students' readiness for change, with psychological empowerment as a crucial mediating influence [11]. Theoretical frameworks such as Bandura's Social Cognitive Theory and Schein's organizational culture model underscore the importance of individual agency and environment in fostering readiness for change, while technological adaptation represents a modern dimension that enhances students' learning and empowerment capabilities [3], [6]. By exploring the interrelationships among these constructs, this study provides insights into the conditions that support final-year students in cultivating readiness for change and preparing for the demands of a constantly evolving professional environment.

This study constructs a conceptual model to examine the influence of resilience, self-efficacy, and critical thinking on final-year students' readiness for change, with organizational culture and technical adaptation as moderating factors and psychological empowerment as a mediating factor. By including organizational culture and technological adaptation as moderators, the study fills a research gap in understanding how external and environmental factors impact internal competencies of resilience, self-efficacy, and critical thinking. This approach highlights a supportive organizational culture and effective technological adaptation integration in students' adaptability and engagement, preparing them for change. The novelty of this research lies in its application of a moderated mediation model, where organizational culture and technical adaptation are assessed as moderating influences on the relationship between students' core competencies and readiness for change. At the same time, psychological empowerment serves as the mediating role. This model provides a comprehensive view of how students' psychological empowerment is shaped by resilience, self-efficacy, and critical thinking and strengthened through supportive environmental factors. The study further contributes to the academic literature by exploring how fostering a positive organizational culture and integrating technology can amplify students' readiness for change, presenting valuable insights for educational institutions to develop adaptive, forward-thinking learning environments.

2. Theory and Hypotheses Development

2.1. Resilience, Organizational Culture, and Technological Adaptation

Carver & Scheier (2023) postulated that optimism is associated with envisioning positive outcomes in the future. Optimists approach challenging but manageable obstacles by focusing on solutions and maintaining their goals through problem-solving and strategic planning (Carver & Scheier, 2023). Optimistic individuals are more likely to exhibit resilience in the face of adversity, even if their progress may be gradual [13]. Miranda & Cruz (2022) emphasized optimism supports students in managing academic challenges, while Dawson & Pooley (2013) highlighted that higher levels of optimism correlate with increased resilience among students. Similarly, Danesh & Shahnazari (2020), Derakhshan *et al.*, (2022), Yu *et al.*, (2022), and Yun *et al.*, (2018) have examined how resilience relates to motivation and academic performance. Fernandez *et al.* (2019) argue that resilience should be studied alongside other interacting variables, and numerous studies have confirmed its critical role in helping individuals manage stress in academic environments, particularly when interacting with organizational culture and technological adaptation. Firstly, organizational culture frequently appears as a central theme in empirical studies on organizational resilience. Spee (2020) examined how the University of Redlands responded to challenges and highlighted the necessity for a culture that

promotes resilience and supports positive change. Similarly, Paunescu & Argatu (2020) emphasized the crucial role of organizational culture, particularly in shaping resilience strategies. Organizations that cultivate a resilience-oriented culture acknowledge that adversity can arise unexpectedly, prompting them to enhance risk awareness and prioritize long-term survival proactively [23].

Technological adaptations, as previous suggestions and logical assumptions drawn from cognitive studies like Gantt (1998), can be argued that humans have limited retention capacity, which significantly depends on their interaction with their environment, and emphasize the importance of moving away from traditional lecture-based teaching towards models that foster higher retention rates. Studies have shown a positive relationship between using information and communication technologies, increased student motivation, and improved academic performance [25], [26]. In Indonesia, AI continues to be regarded as highly significant, particularly among educators and technology developers who seek to integrate learning strategies into educational settings [27]. [28] have explored various aspects, including its usability, challenges, and emerging opportunities in AI in higher education. One prominent AI tool utilized is ChatGPT, which university students and lecturers have widely adopted to improve work efficiency and deliver comprehensive learning materials [29], [30]. Based on the discussion, the relationship between resilience, organizational culture, and technological adaptations is analyzed through the following hypotheses:

- H1 Resilience has a positive influence on organizational culture
- H2 Resilience has a positive influence on technical adaptation

2.2. Self-efficacy, Organizational Culture, and Technological Adaptation

Self-efficacy theory, a core component of Bandura's social cognitive theory, has been recognized as one of his most significant contributions to academic achievement, learning, and motivation [31], [32]. Bandura (2001) noted that students' behavior is often best predicted by perceptions of their abilities. According to Bandura (1997), self-efficacy affects how students feel, think, and behave. Self-efficacy theory suggests that it is one's confidence in one's capability to plan and execute a specific course of action to solve a problem or complete a task [33]. Therefore, student self-efficacy refers to the belief in their ability to learn and perform tasks at a certain level. High self-efficacy in students fosters skill development, capacity building, and resilience by enhancing motivation, commitment to tasks, perseverance, and resilience, particularly in the face of challenges [34]. Nasa (2014) argued that students' abilities offer a way to explain and predict their emotions, thoughts, and behaviors and organize and carry out actions needed to achieve specific objectives. Students build academic self-efficacy by assessing and interpreting their performance, which involves self-evaluations of competence [10], [36]. Ansong *et al.*, (2019) suggested that students' self-efficacy tends to increase when they believe their academic efforts are successful but decreases when they perceive their efforts as inadequate. Consequently, students with high self-efficacy tend to excel in achieving their goals, including overcoming challenges and absorbing new information, achieving high performance, such as good grades, and outperforming their peers. When students believe they are skilled at something, they persist and remain dedicated, even in the face of failure [38]. Students must foster an understanding and embed the values of higher education organizational culture, both formally and informally, to grasp its vision and goals and see themselves as integral components of the organizational culture system. We focus on student readiness to change by sharing values and beliefs and guiding higher education toward success. Organizational culture also establishes guidelines, including principles, values, symbols, and respectful language used in communication [39]. It represents a set of shared beliefs and values developed within the organization and addresses external challenges through collective problem-solving. The culture is typically shaped by the organization's founders and further developed by teams as they learn to tackle external and internal adaptation challenges [40].

In contrast, the rapid pace of technological evolution will continue to drive future developments in today's high-tech world. Higher education productivity increasingly relies on integrating relevant technologies into their operations. These technological advancements have significantly transformed organizations, optimizing learning processes to be more efficient and streamlined. Earlier findings have demonstrated that using technology amplifies the effects of ICT. However, adaptation to new technology tends to be slow when it involves complex skills, high costs, and significant time commitments [41]. To remain competitive and sustain their existence, organizations must adapt their strategies, processes, structures, and cultures [42]. Selecting the appropriate model for planned change is crucial to ensure that the transformation process occurs

smoothly and that strategic objectives are achieved [43]. Numerous studies have investigated the influence of Information Technology on organizational services and performance [44], [45]. While these studies generally highlight IT's significant role in enhancing the quality and quantity of information, its potential for adoption and innovation remains uncertain [46]. Based on the discussion, the relationship between self-efficacy, organizational culture, and technological adaptation is analyzed through the following hypotheses:

- H3 Self-efficacy has a positive influence on organizational culture
- H4 Self-efficacy has a positive influence on technological adaptation

2.3. Critical Thinking, Organizational Culture, and Technological Adaptation

Critical thinking is widely recognized as an essential competency in the 21st century. Recent labor market analyses indicate a rising demand for jobs that emphasize soft skills [47]. Adult learning is often described as an educational process outside formal systems [48]. Adult education, adult learning, and lifelong learning are sometimes used interchangeably, though they can be interpreted in distinct ways [48]. Given adulthood's typically complex schedules and responsibilities, a key feature of adult learning is its flexible time and location, allowing adult learners to participate in educational activities alongside their employment and other adult roles [49]. As an internal process, or one that occurs within the learner, adult learning can be viewed as a transformative or change-oriented process driven by learning activities, with selectiveness and self-directedness being central characteristics of the adult learner [48], [50]. Critical thinking teaching and learning differ from traditional educational environments and audiences in non-formal education settings. These differences are observable in at least two areas: the cognitive development of adult learners [49], [51], [52] and the external conditions of learning, such as the diversity and availability of learning activities, schedules, degree of isolation while studying, and study modalities like online or offline learning. According to Garrison (1991), socioeconomic factors in adulthood shape the methodology of organizing adult education, particularly impacting self-directed learning versus collaborative learning. These socioeconomic factors include roles, responsibilities, and economic conditions associated with adulthood [48], [53].

Given the critical role of critical thinking, it is evident that it not only enhances individual decision-making and problem-solving abilities but also fosters a culture of innovation and adaptability within organizations. A transformative process can lead to a more resilient organizational culture characterized by continuous improvement and a willingness to embrace change [54]. As organizations increasingly integrate advanced technologies into their operations, critically assessing and adapting these changes becomes paramount. Critical thinkers are more likely to engage with new technologies thoughtfully, evaluating their implications and potential applications within their organizational context. This proactive engagement not only aids in transitions during technological shifts but also cultivates a workforce better equipped to leverage technology for enhanced productivity and innovation [55]. Based on the literature, the following hypotheses are proposed

- H5 Critical thinking has a positive influence on organizational culture
- H6 Critical thinking has a positive influence on technological adaptation

2.4. Organizational Culture as Moderator

Resilience is essential for achieving emotional stability and social success [56], and it is described as "a process of interactive adaptation that aids in overcoming adversity" [57]. According to Vinkers et al., (2020), resilience is crucial for managing stress and maintaining equilibrium. Resilience has a role in handling stress and uncertainty, which are common in academic environments, particularly when facing massive changes and ensuring the readiness to change. Prior studies have explored the importance of resilience in academics [59], particularly its role in supporting psychological and social well-being [60] and its strong connection to managing stress [61]. Furthermore, Dohaney et al., (2020) highlighted key factors in developing or hindering resilience, such as support systems, community, leadership, and strategic planning in academic institutions. Self-efficacy reflects an individual's belief in their ability to succeed in specific situations and is influenced by the organizational culture of higher education. A supportive organizational culture creates an environment that encourages students to take risks and engage in self-exploration. When students perceive their educational environment as encouraging and supportive, their confidence in their abilities will likely increase, positively influencing their readiness to adapt to new situations and challenges [32], [36]. Support systems,

community, leadership, and strategic planning within academic institutions play critical roles in developing self-efficacy and fostering an environment conducive to change [62]. An organizational culture emphasizing inquiry, reflection, and open dialogue enhances students' critical thinking skills, making them more adaptable and prepared for change [4], [51]. In an educational culture that values critical thinking, students will likely engage more deeply with the material, enhancing their ability to navigate change thoughtfully and proactively. This deep engagement fosters essential thinking skills and contributes to their readiness to embrace the challenges of transitions in their academic and professional lives. Therefore, to understand organizational culture as moderate to readiness for change, the following hypotheses are presented:

- H7 Organizational culture moderates the relationship between resilience and readiness for change
- H8 Organizational culture moderates the relationship between self-efficacy and readiness for change
- H9 Organizational culture moderates the relationship between critical thinking and readiness for change

2.5. Technological Adaptation as Moderator

Technological adaptation is how individuals, organizations, or educational institutions adjust to and integrate new technologies into their existing practices and systems [63]. This process involves the practical use of technology and the ability to modify behaviors, develop new skills, and embrace changes that technology brings. Technological adaptation emphasizes how students and educators leverage digital tools and resources to enhance learning outcomes, foster collaboration, and improve educational experiences. A strong focus on technological adaptation can enhance students' resilience by providing them with the necessary tools and resources to cope with academic pressures and changing environments [64]. When students are adept at using technology, they can better manage stress and uncertainty, increasing their readiness to change. Integrating technology into educational practices fosters an environment where students can adapt to new challenges and develop essential skills for future success [65]. Technological adaptation also significantly enhances self-efficacy by providing students with opportunities to engage with new learning tools and resources that empower them to take ownership of their education [66]. When students are confident in their technology use, they are more likely to feel competent in navigating academic challenges and adapting to new situations. As a result, this heightened self-efficacy can increase readiness for change, enabling students to embrace new learning environments and experiences. In an era of technological advancements rapidly changing the educational landscape, adapting to technology is crucial for fostering critical thinking skills [4]. Technological adaptation in higher education encourages inquiry, collaboration, and reflective thinking, which are vital for developing critical thinking abilities [51], [53]. From the explanation above, we propose the following hypothesis to determine whether technological adaptation moderates

- H10 Technological adaptation moderates the relationship between resilience and readiness for change
- H11 Technological adaptation moderates the relationship between self-efficacy and readiness for change
- H12 Technological adaptation moderates the relationship between critical thinking and readiness for change

2.6. Psychological Empowerment as a Mediator

Rappaport (1987) proposed that empowerment embodies a belief in individuals' inherent ability to influence their destiny and actively participate in their community. Similarly, Conger & Kanungo (1988), drawing on Bandura's theory, characterized empowerment as enabling individuals to enhance their sense of self-efficacy within an organizational context. They further described empowerment as a form of intrinsic motivation, aligning with Thomas & Velthouse (1990), who defined it as an increase in inherent task motivation. Empowerment can be understood in two distinct ways: first, as a psychological concept emphasizing personal agency and control, and second, in a broader context encompassing social influence, political authority, and legal rights [67]. Maynard *et al.*, (2012) identified two primary dimensions of empowerment: structural, which pertains to organizational systems and frameworks, and psychological, which focuses on individual perceptions. Psychological empowerment relates to personal experiences, while structural empowerment addresses organizational mechanisms (Spreitzer, 1995). In line with structural empowerment through psychological empowerment (Spreitzer, 1995), we argue that organizational culture of higher educational

institutions with psychological empowerment for final-year students will foster their confidence, competence, and motivation for post-campus transitions and resilient individuals.

Organizational culture, mainly through a clan culture, emphasizes collaboration, teamwork, and empowerment and significantly influences employees' behaviors, attitudes, and values, subsequently impacting organizational performance and effectiveness [71]. Organizational member are also crucial in shaping organizational culture, as their values, attitudes, and behaviors can reinforce or challenge the existing culture. Furthermore, the role of technology is becoming increasingly important in shaping organizational culture, as it can change how employees communicate, collaborate, and work. Finally, the history and ownership of an organization can also influence its culture, as the values and traditions of the organization's founders and leaders may continue to shape organization's culture long after they have left. Similarly, the ownership structure of an organization can influence its culture, with private companies prioritizing profitability and growth while nonprofit organizations prioritize social impact and community involvement [71]. Organizational culture determinants are complex and multifaceted, and various factors can influence employees' values, behaviors, and attitudes. This relationship highlights the importance of creating a supportive environment where technological integration is paired with efforts to empower students psychologically, fostering a more adaptable and resilient student body. This study proposes the following hypothesis to determine the mediating role of psychological empowerment

- H13 Psychological empowerment mediates organizational culture to readiness for change
- H14 Psychological empowerment mediates technological adaptation to readiness for change

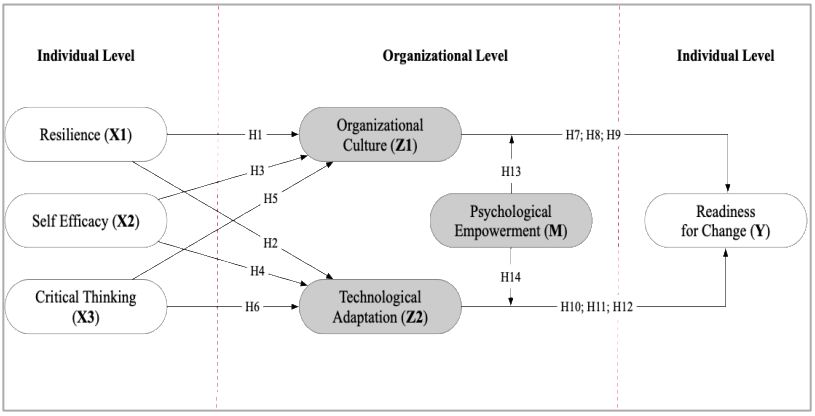

Figure 1. Conceptual Framework

3. Method

This study employs a quantitative approach to quantify or measure data, typically involving statistical analysis [72]. This study aims to examine the relationships between variables based on objective theories. After collecting data through surveys, the data is grouped and analyzed using model testing with confirmatory factor analysis (CFA), specifically applying Multi-level CFA (MCFA). The study utilizes random purposive sampling, combining random selection with deliberate judgment to select samples that meet specific criteria or characteristics relevant to the research objectives [73].

The study was conducted at three different universities in Indonesia, and data was collected through Google Forms and hard-copy surveys. Data collection was conducted for three months, from August to October 2024, to ensure a diverse sample and comprehensive understanding of the variables under study. A total of 330 respondents were initially collected for analysis, comprising 135 final-year students and 195 higher education members. However, to enhance the variability of the results, there were two rounds of data collection, we distributed the questionnaire again in February 2025 to a new sample of 460 respondents, consisting of 255 final-year students and 205 higher education members. Final-year students were given

questions to assess their resilience, self-efficacy, critical thinking, and readiness for change during their university studies, and these were measured at individual-level analysis. Population selection of final-year in higher education is based on the following considerations: (1) Consistency with the aim of study to explore resilience and self-efficacy impact on students' readiness for change [74] (2) significance to psychological constructs, as resilience and self-efficacy offer meaningful perspectives on strengthening students' adaptability [75], and (3) facilitating students in acquiring fundamental competencies necessary for both their professional careers and personal development [76], [77]. Members of higher education institutions (HEI) are provided with questions to assess organizational culture, psychological empowerment, and technological adaptation to gain insights into the dynamics that influence student readiness for change. Respondent characteristics are presented below

Respondent Characteristic	**Total Respondents (n = 460)**		**Final-year Students (n = 255)**		**Higher education members (n = 205)**	
Gender						
Male	167	36%	77	30%	90	44%
Female	293	64%	178	70%	115	56%
Age Group						
18 – 24 Years	345	75%	167	65%	178	87%
25 – 30 Years	115	25%	88	35%	27	13%

Table 1. Demographic Characteristics of Respondents

3.1. Measurements

Appendix A lists all the items used in this study and the sources. A questionnaire is divided into two sections: individual-level and organizational-level. The individual-level questionnaire consists of 30 questions, scored using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). The example item, "*I am confident in my ability to adapt to new challenges in my academic and professional life, " examines resilience through self-belief, persistence, anxiety, and uncertainty control.*" Self-efficacy is measured in three dimensions by Schwarzer (1995), with an example statement item: "*I am confident that I can overcome any challenges I may face during my transition to the workforce or further studies*." Critical thinking skills were assessed using a pilot critical thinking assessment tool. This assessment tool consists of selected and constructed-response items and was designed to reflect the four critical thinking dimensions proposed by Liu *et al.*, (2014). An item representing essential thinking is, "*I can accurately interpret information and identify key points related to my transition to the workforce or further studies*." Additionally, Wang et al., (2023) have prioritized primary constructs and the selection of four key constructs for readiness for change in education contexts; they are personal efficacy, personal valence, personal commitment, and personal leadership. Readiness for change is evaluated with an item such as, "*I believe I can successfully adapt to new environments and situations after graduation*." Meanwhile, questionnaire for organizational level consists of 22 items. Organizational culture was measured by employing the questionnaire adopted from Quinn (2011), which includes five items, with an example item to measure: "*The leadership in this institution actively models behaviors that promote change readiness and adaptability among students*." We used a 5-item scale of technology adaptation derived from Schillewaert *et al.*, (2005), with items such as, "*The institution regularly shares updates and information about new technological tools and platforms that are available for student use*." Finally, the instrument applied for psychological empowerment was proposed by Spreitzer (1995) —meaning, competence, and impact, with example statement items, "*Students view the changes they face as meaningful steps toward achieving their career aspirations and educational goals*."

3.2. Multi-level Confirmatory Factor Analysis (MCFA)

In Confirmatory Factor Analysis (CFA), data utilized for analysis are presumed to be independent. In contrast, Multi-level Confirmatory Factor Analysis (MCFA) treats parameters as random components that fluctuate across higher-level units [83]. MCFA specifically decomposes the covariance matrix into two components: a pooled-within-cluster covariance matrix (e.g., measurement day) and a between-cluster covariance matrix (e.g., respondent data) to model the hierarchical nature of the responses appropriately (Kim *et al.*, 2016; Muthén, 1994). The pooled-within-cluster covariance matrix represents how item responses co-vary due to individual-level influences. In contrast, the between-cluster covariance matrix captures variations in the average response to each item across individuals. Consequently, MCFA estimates both within-cluster and between-cluster covariance matrices, as distinct models are specified for each analytical level (Muthén, 1994). Muthén (1994) outlined a systematic step approach for conducting MCFA. First, a standard CFA is performed using the total sample covariance matrix. Second, the Intraclass Correlation Coefficient (ICC) is calculated for each item to evaluate between-group variability, determining the proportion of variance attributable to differences between individuals. Third, CFA is applied to the pooled-within covariance matrix, followed by a separate CFA on the between-group covariance matrix in the last step.

4. Result and Discussion

4.1. Classical Assumption Test

4.1.1. Normality Test

The normality test results using the Kolmogorov-Smirnov test indicate that all variables in this study—Resilience, Self-Efficacy, Critical Thinking, Organizational Culture, Technological Adaptation, Psychological Empowerment, and Readiness for Change—exhibit a distribution that approximates normality. This conclusion is based on the Asymp. Sig. (2-tailed) values obtained for each variable, all of which exceed the 0.05 significance threshold. Since all significance values exceed 0.05, it can be concluded that the data for each variable meet the assumption of normality [85], [86]. Consequently, subsequent analyses can employ parametric statistical methods, such as Structural Equation Modeling (SEM) or linear regression, without requiring data transformation or alternative approaches to address non-normal distributions.

Variables	**Kolmogorov-Smirnov Statistic**	**Asymp. Sig. (2-tailed)**
Resilience (X1)	1.023	0.2
Self-Efficacy (X2)	1.056	0.185
Critical Thinking (X3)	1.034	0.175
Organizational Culture (Z1)	1.067	0.16
Technological Adaptation (Z2)	1.089	0.14
Psychological Empowerment (M)	1.012	0.15
Readiness for Change (Y)	1.078	0.13

Table 2. Normality Test

4.1.2. Multicollinearity Test

Based on the analysis of the Variance Inflation Factor (VIF) and Tolerance (Table 3), there is no indication of multicollinearity issues among the variables in this study. All VIF values are below 10, and Tolerance values exceed 0.1, indicating that there are no strong linear relationships among the independent variables that could distort SEM analysis [85], [86]. Therefore, the model can proceed to SEM without the need to address multicollinearity concerns.

Variables	Tolerance	VIF
Resilience (X1)	0.712	1.405
Self-Efficacy (X2)	0.685	1.46
Critical Thinking (X3)	0.698	1.432
Organizational Culture (Z1)	0.621	1.61
Technological Adaptation (Z2)	0.64	1.563
Psychological Empowerment (M)	0.725	1.38
Readiness for Change (Y)	0.69	1.449

Table 3. Multicollinearity Test

4.2. Internal Structure Across Level

Before conducting the MCFA, a CFA was performed on the total covariance matrix (Step 1). The results demonstrated a good model fit, confirming the suitability of proceeding with the multilevel analysis. The statistical analysis indicates that the correlated four-factor model provides the best fit to the data compared to alternative models. This model yielded $\chi^2 = 685.30$, df = 200, CFI = 0.94, TLI = 0.93, RMSEA = 0.04, and SRMR = 0.03–0.04, demonstrating a strong model fit. In contrast, the one-factor and three-factor models exhibited significantly lower fit, with CFI values below 0.92 and RMSEA exceeding 0.05, suggesting that these models do not adequately capture the data structure. While the multilevel model also showed a reasonable fit, it remained inferior to the correlated four-factor model, reinforcing its suitability for analysis. The weak metric invariance model maintained an acceptable fit (CFI = 0.94, TLI = 0.93, RMSEA = 0.04), whereas the strong metric invariance model demonstrated a substantial decline in fit (CFI = 0.65, TLI = 0.63, RMSEA = 0.08). These results indicate that the correlated four-factor model is the most appropriate representation of the studied variables. This model serves as a robust foundation for examining the effects of resilience, self-efficacy, critical thinking, organizational culture, technological adaptation, and psychological empowerment on readiness for change. Table 4 displays the fit indices for all tested models.

Models	χ^2	df	CFI	TLI	RMSEA	SRMR	AIC	BIC
Step 1: Total Model	780.25	100	0.94	0.93	0.05	0.03	95,210.32	95,524.10
Step 3: Within-Group Model	675.8	100	0.93	0.91	0.05	0.03	61,325.42	61,537.83
Step 4: Between-Group Model	940.4	100	0.89	0.87	0.12	0.04	9,850.23	10,009.65

Step 5: Multilevel Model	685.3	200	0.94	0.93	0.04	.03–.04	86,721.56	87,256.89
One-Factor Model	1,990.1	210	0.78	0.74	0.07	.06–.10	89,134.24	89,600.75
Three-Factor Model	835.45	204	0.91	0.9	0.05	.04–.06	87,012.68	87,512.19
Second-Order Model	700.78	202	0.94	0.93	0.04	.03–.05	86,768.13	87,280.41
Weak Metric Invariance Model	710.62	210	0.94	0.93	0.04	.03–.05	86,742.89	87,208.56
Strong Metric Invariance Model	3,120.55	230	0.65	0.63	0.08	.11–.18	90,420.37	90,793.14

Table 4. Model Fit Indices for Total, Within-Group, Between-Group, and Multilevel Analyses

In Step 2, the variability of individual items was assessed by calculating the Intraclass Correlation Coefficient (ICC) for each item. ICC (1) aims to assess the homogeneity of variables between groups. Bliese & Castro (2000) suggest ICC (1) value in a range of 0.05–0.20 is sufficient to use multi-level models. An ICC (1) value more excellent than 0.25 indicates substantial differences between groups, making multi-level analysis highly appropriate.

Variables	**ICC1**	**ICC2**	**RWg**	**P-Value**
Resilience (X1)	0.55	0.79	0.70	0.00
Self-efficacy (X2)	0.51	0.76	0.66	0.00
Critical thinking (X3)	0.47	0.72	0.64	0.01
Organizational culture (Z1)	0.59	0.74	0.72	0.00
Technological adaptation (Z2)	0.49	0.73	0.64	0.01
Psychological empowerment (M)	0.53	0.77	0.68	0.00
Readiness for change (Y)	0.56	0.71	0.70	0.00

Table 5. Correlation Coefficient ICC (1), ICC (2) and RWg

According to study in Table 5, calculated ICC (1) values for each variable at individual level range from 0.47 to 0.59, thus supporting multi-level analysis. LeBreton & Senter (2008) recommend group reliability values of ICC (2) $>$ 0.70 for good stability of group means. ICC (2) values up to 0.70 indicates each variable has a good reliability level between the sample groups. RWg is employed to assess consistency of responses within groups. James *et al.*, (1984) recommend a value of $\geq$ 0.70 as a minimum threshold for good agreement, while LeBreton & Senter (2008) indicate RWg values in a range of 0.51 - 0.69 can still be considered moderate agreement, but caution is needed in interpretation. The data processing results show values greater than 0.6, ranging from 0.64 to 0.72, thus supporting aggregation in multi-level model calculations. Therefore, based on the ICC (1), ICC (2), and RWg values for each variable, along with P-Values, all less than 0.05, the data at

the individual level supports multi-level model analysis. Steps 3 and 4 involved separately examining the factor structures at the within-group and between-group levels, within-group analysis as presented below:

Hypotheses	Path	Estimate	S.E.	Est/ S.E.	P-value
H1	Resilience → Organizational culture	0.70	0.06	11.67	0.00
H2	Resilience → Technological adaptation	0.68	0.07	9.71	0.00
H3	Self-efficacy → Organizational culture	0.75	0.05	15.00	0.00
H4	Self-efficacy → Technological adaptation	0.72	0.06	12.00	0.00
H5	Critical thinking → Organizational culture	0.78	0.04	19.50	0.00
H6	Critical thinking→ Technological adaptation	0.70	0.06	11.67	0.00

Table 6. Path Analysis Results

The results, summarized in Table 6, highlight the significance of these paths.

H1 Analysis reveals a strong positive relationship between resilience and organizational culture, with an estimated 0.70 ($p < 0.05$).

H2 Analysis indicates a significant positive relationship between resilience and technological adaptation is 0.68 ($p < 0.05$).

H3 A strong relationship between self-efficacy and organizational culture shows a robust estimate of 0.75 ($p < 0.05$).

H4 The analysis also indicates a significant positive relationship between self-efficacy and technological adaptation, with an estimated 0.72 ($p < 0.05$).

H5 The relationship between critical thinking and organizational culture has an estimate of 0.78 ($p < 0.05$), which indicates a significant positive relationship

H6 Critical thinking to technological adaptation is estimated at 0.70 ($p < 0.05$), indicating a significant but weaker relationship than the other paths.

Multi-level analysis was conducted on 205 higher education members. Data processing was employed using *MPlus 8.3*. The complete results of the multi-level analysis are presented below:

Hypotheses	Path	Estimate	S.E.	Est/ S.E.	P-value
H7	Organizational culture moderates resilience → Readiness for change	0.75	0.06	12.50	0.00
H8	Organizational culture moderates self-efficacy → Readiness for change	0.72	0.07	10.29	0.00
H9	Organizational culture moderates critical thinking → Readiness for change	0.70	0.06	11.67	0.00

H10	Technological adaptation moderates resilience → Readiness for change	0.73	0.06	12.17	0.00
H11	Technological adaptation moderates self-efficacy → Readiness for change	0.71	0.07	10.14	0.00
H12	Technological adaptation moderates critical thinking → Readiness for change	0.69	0.07	9.86	0.00

Table 7. Moderation Analysis Results

Multi-level analysis explored how organizational culture and technological adaptation moderate relationships among resilience, self-efficacy, and critical thinking concerning readiness for change among final-year students. The results of analysis presented in Table 5, provide essential insights into moderating effects of organizational culture and technical adaptation.

H7 Result indicates organizational culture significantly moderates relationship between resilience and readiness for change, with an estimated 0.75 ($p < 0.05$).

H8 Relationship between self-efficacy and readiness for change is also significantly moderated by organizational culture, with an estimated 0.72 ($p < 0.05$).

H9 Analysis shows that critical thinking positively influences readiness for change with the moderation of organizational culture (estimate 0.70, $p < 0.05$).

H10 Results indicate that technological adaptation also moderates the relationship between resilience and readiness for change, with an estimate of 0.73 ($p < 0.05$).

H11 The relationship between self-efficacy and readiness for change, moderated by technological adaptation, is estimated at 0.71 ($p < 0.05$).

H12 The relationship between critical thinking and readiness for change, moderated by technological adaptation, is estimated at 0.69 ($p < 0.05$).

4.3. R-Square

R-squared explains how dependent variable (output) can be predicted from model's independent variables (input). The R-squared value ranges from 0 to 1, with 1 indicating independent variables can explain all variability in dependent variable and 0 indicating that no variability in dependent variable can be explained by independent variables [90]. The results of R-squared are as follows

Observed Variables	**Estimate**	**S.E.**	**Est/ S.E.**	**P-value**
Readiness for Change (H7; H8; H9; H10; H11; H12; H13; H14)	0.912	0.018	50.667	0.00)

Table 8. Estimates of Observed Variables for Readiness for Change

The R-squared value for readiness for change is 0.912, indicating that 88.9% of variability in readiness for change can be explained by resilience, self-efficacy, critical thinking, organizational culture, technological adaptation, and psychological empowerment. The remaining 8.8% is influenced by other variables not examined in this study.

4.4. Mediation Effect on Psychological Empowerment

The Sobel test examined mediation effects of psychological empowerment on relationships between organizational culture and readiness for change. The results of the Sobel test are summarized in the table below.

Hypotheses	Path	Estimate	S.E.	Est/ S.E.	P-value
H13	Organizational culture → Psychological empowerment	0.75	0.07	10.71	0.00
	Psychological empowerment → Readiness to Change	0.72	0.08	9.00	0.00
	Sobel Test	0.70	0.06	11.67	0.00
H14	Technological adaptation → Psychological empowerment	0.71	0.09	7.89	0.00
	Psychological empowerment → Readiness to Change	0.70	0.10	7.00	0.00
	Sobel Test	0.69	0.08	8.63	0.00

Table 9. Sobel Test

H13 The Sobel test result ($\beta = 0.70$, $p < 0.001$) further confirms the mediating role of psychological empowerment in this relationship, highlighting its critical function in fostering adaptability.

H14 The Sobel test result ($\beta = 0.69$, $p < 0.001$) confirms the mediation effect, demonstrating that psychological empowerment bridges the link between technological adaptation and readiness for change.

4. Discussion

This study examined relationship between resilience, self-efficacy, and critical thinking for readiness for change among final-year students in three HEIin Indonesia. Furthermore, organizational culture and technological adaptation are moderating, and psychological empowerment mediates. The results showed a significant relationship between resilience, self-efficacy, and critical thinking for organizational culture, supporting hypotheses 1, 3, and 5. The findings are in line with studies that observe the relationship between resilience, self-efficacy, and critical thinking for organizational culture [91], [92], [93], [94], [95]. The findings indicate that students with a positive outlook are more inclined to exert control over their environment and demonstrate greater confidence in their ability to address and overcome challenges. Maintaining a positive perspective on life and the future enhances resilience, fostering a readiness to confront adversity and navigate difficult situations. The findings further indicated that students' perspectives on life and capacity to address and manage challenges are crucial [96]. This suggests that final-year students exhibit a sense of self-satisfaction, the ability to form meaningful connections that align with their needs, and a perception of themselves as growing and evolving individuals. Additionally, these students may possess explicit purposes and aspirations, such as fostering creativity, enhancing efficiency, or attaining emotional stability in the future, all of which shape their approach to managing difficult situations. Meanwhile, [93] argue organizational culture is an artifact that reflects the beliefs and values shared by organizational members, with the deepest level of culture being the basic assumptions members rely on to adapt to their

environment. Organizational culture works as a cohesive force, uniting members with the institutional system while fostering positive and innovative work behaviors [97].

The findings indicate a significant relationship between resilience, self-efficacy, and critical thinking to technological adaptation, supporting hypotheses 2, 4, and 6. In this modern era, the rapid advancement of technology compels academics to adapt promptly. One approach to adaptation involves digitalizing learning processes by integrating technology into teaching and learning activities. Adaptability is an individual's capacity to make "appropriate cognitive, behavioral, and/or affective adjustments in the face of uncertainty and novelty" [98]. [98] argue that trait-like capacity represents a specific form of general self-regulation of cognition, behavior, and affect, which becomes critical when individuals encounter uncertainties and novel situations that disrupt routines and impose new circumstances, as observed in the modern era. This study defines resilience as the capacity to adjust effectively, overcome obstacles, and maneuver through various circumstances [99]. [100] demonstrated that intrinsic and extrinsic motivation can predict psychological resilience, with self-efficacy acting as a mediator. Similarly, a study on Southeastern University undergraduate students revealed self-efficacy's mediating role in the relationship between adverse life changes and resilience [101]. According to [102], self-efficacy significantly predicts academic success and resilience among college students. We argue that critical thinking, the capacity to think clearly and rationally while evaluating logical connections between ideas, is a necessary cognitive skill for resilience and self-efficacy. Critical thinking involves analyzing arguments, assessing evidence, and making reasonable inferences based on that evidence. Its key components include analysis, which consists of breaking down complex information into manageable parts; evaluation, which assesses the credibility and validity of sources; and inference, which entails concluding logical reasoning [103]. Students with high levels of resilience and self-efficacy remain engaged and persevere when faced with the demands of change. These traits have proven critical factors in various positive outcomes, including enhanced critical thinking, increased achievement motivation, improved academic performance, and compelling technological adaptation.

The findings highlight the moderating effects of organizational culture and technology adaptation on the relationships between resilience, self-efficacy, critical thinking, and readiness for change, validating hypotheses 7, 8, 9, 10, 11, and 12. Organizational culture is characterized as a complex set of values, beliefs, assumptions, and symbols that define how a firm conducts its business [104]. Students' abilities, such as resilience and problem-solving approaches, will likely develop and transform through this socialization process. As discussed earlier, resilience and self-efficacy in final-year students are demonstrated by their ability to overcome challenges, effectively utilize resources within their educational setting, and exhibit determined efforts to achieve their objectives, supported by their critical thinking skills in adapting to changes [96], [102]. According to the interactive perspective, resilience in individuals is shaped by both personal and organizational factors. Meanwhile, technology adaptation refers to how individuals integrate information and communication technology into their tasks [105]. Furthermore, technology adaptation encompasses understanding how users accept and utilize technology effectively [64], [65]. [106] emphasize the importance of organizations communicating information technology's advantages, ease of use, and adaptability to target users to influence their IT adaptation behavior positively. Building on prior studies, we posit that sufficient technological adaptation within higher education institutions, along with accessible information, significantly impacts individuals' ability to readiness for change to modern technology. This aligns with [106], who underscore the role of human factors—such as skills, technical expertise, training, attitudes, and education—in shaping technology adaptation. We contend that the selection of technology should go beyond merely adopting the latest innovations (technology adoption); instead, HEI must cultivate technology adaptation to effectively engage with and address the needs of stakeholders, particularly final-year students, to readiness for change in the job market.

Psychological empowerment is conceptualized as a form of intrinsic motivation expressed through four cognitive dimensions: (a) meaning (the value of work), (b) competence (an individual's belief in their ability to perform their tasks), (c) self-determination (the ability to make decisions concerning the organization), and (d) impact (the effect of their work on organizational outcomes) [107]. The findings of this study confirm the acceptance of hypotheses H13 and H14, indicating that psychological empowerment acts as a mediator between organizational culture and technological adaptation in higher education institutions, influencing final-year students' readiness for change. These results are consistent with [108], who found a relationship between psychological empowerment and performance. This alignment is associated with the "meaning" dimension of psychological empowerment. Moreover, when individuals are confident in their competence to manage a situation (the second dimension of psychological empowerment), they perceive the task as a

challenge rather than a threat or stress [109]. Regarding self-determination, [108] suggested that a perceived lack of autonomy can create a sense of restriction, resulting in elevated stress levels, a conclusion supported by the present study. In other words, when autonomy, competence, and relatedness are fulfilled within an organization, members tend to exhibit higher levels of commitment and motivation. Education is widely acknowledged as a vital component of the knowledge economy, and its quality assessment is critical for promoting sustainable societal development. Consequently, HEI are continually faced with the challenge of ensuring and certifying the quality of their educational offerings while complying with regulatory authorities' standards. In this regard, over the past decade in Indonesia, several legal reforms, redesigns, and methodologies for evaluating higher education quality have been introduced to enhance the education system and ensure its standards. However, adopting new evaluation models has led to significant organizational shifts and increased demands on faculty, who must embrace new roles and adapt their capacities to meet emerging challenges. As observed in other educational contexts, these transformations have added further burdens to their professional performance, increasing stress levels.

5. Conclusion

This study employs a quantitative approach to explore the relationships between resilience, self-efficacy, critical thinking, and readiness for change among final-year students in HEI in Indonesia. Through CFA and Multi-level CFA, the research involved 460 respondents, including 255 final-year students and 205 higher education members. The study highlights the significant role of resilience, self-efficacy, and critical thinking in fostering student readiness for change, with organizational culture and technological adaptation as moderating factors. The findings align with existing research, demonstrating that students with higher resilience, self-efficacy, and critical thinking are more adaptable to change, especially in a rapidly evolving technological landscape. Additionally, the study underscores the importance of psychological empowerment in mediating the effects of organizational culture and technological adaptation on students' readiness for change. Psychological empowerment, characterized by meaning, competence, self-determination, and impact, is crucial in enhancing students' engagement and motivation, influencing their ability to adapt to change. The research also emphasizes the need for HEI to cultivate an environment that promotes technological adaptation and psychological empowerment, as these factors are essential for preparing students for future challenges in the workforce. These findings contribute valuable insights for educational institutions aiming to enhance curricula and support mechanisms that foster critical skills for students' personal and professional growth.

5.1. Limitation

To the best of the author's knowledge, this is the first national empirical study providing a specific role of psychological empowerment in higher education institutions, where resilience, self-efficacy, and critical thinking are often directly associated with drastic changes in organizational structure, policies, and educational practices in technology era. However, the findings should not be generalized to all dimensions of variables or other organizations due to certain research limitations. First, population included only final-year students and higher education members, with a sample size of 460 respondents (255 students and 205 higher education members). While this sample size is sufficient for statistical analysis, it may not fully capture the diversity of experiences across all higher education settings. Second, the study utilized random purposive sampling, which combines random selection with deliberate judgment to meet specific research objectives, potentially introducing selection bias. Third, the geographical scope of the research was confined to three universities in Indonesia, which may limit the applicability of findings to other regions or countries with different cultural, political, and economic contexts. Moreover, the study employed a cross-sectional design, collecting data during a specific three-month period from August to October 2024. This approach may not account for temporal variations in the relationships between variables, such as resilience, self-efficacy, critical thinking, and readiness for change. Data collection methods, including surveys via Google Forms and hard copies, also rely on self-reported measures, which could introduce response biases. Despite these limitations, the study utilized robust quantitative methods, including MCFA, to examine relationships between individual- and organizational-level variables, thereby providing valuable empirical insights. Nevertheless, future research should consider expanding the scope to include non-academic staff, students from diverse disciplines,

and universities with varying institutional characteristics. Longitudinal studies could also offer a more comprehensive understanding of these relationships' temporal dynamics. These steps would enhance the generalizability and depth of knowledge of the studied constructs.

5.2. Implication

This study aligns with [110], emphasizing self-efficacy, resilience, and critical thinking in equipping final-year students to adapt to change. It introduces an innovative model that incorporates key variables affecting self-efficacy, resilience, and critical thinking, with organizational culture and technological adaptation as moderating factors and psychological empowerment as mediators for readiness for change among final-year students in Indonesia. This model enriches theoretical and facilitates practical application for studies and practitioners. However, while this study offers a systematic contribution to advancing theoretical knowledge, it also identifies opportunities for further investigation and refinement. From a practical perspective, prior research on self-efficacy and resilience often overlooks essential elements of human adaptation and growth, favoring a focus on potential over development. This gap highlights the need for a shift in approach. The findings of this study aim to address the challenges Indonesian students face by providing practical recommendations for support. Self-efficacy, resilience, and critical thinking are pivotal for educational psychology and carry significant implications for assessment, intervention, consultation, research, and training. As these abilities can be developed and taught, it becomes imperative for university leaders and policymakers to implement initiatives that strengthen students' capacity to overcome challenges. Prioritizing workshops and seminars to promote understanding of these skills is crucial.

Programs like self-efficacy training grounded in social cognitive theory provide practical strategies to enhance students' confidence and adaptability. Likewise, resilience-building initiatives, like the "Road to Resilience" program by the American Psychological Association, employ techniques such as cultivating relationships, setting and pursuing goals, exercising self-control, maintaining a positive outlook, and fostering self-belief, offering a comprehensive framework for skill development. For counselors, educators, and practitioners, this study underscores the need to design targeted programs that enhance self-efficacy and resilience, particularly for final-year students facing adjustment difficulties. The findings advocate expanding counseling services and offering customized support to meet students' needs. Additionally, the insights generated by this research serve as valuable resources for academics, researchers, and university administrators. This study also highlights the potential for future research further to explore self-efficacy, resilience, and associated factors, facilitating the identification of new findings that can be broadly applied across diverse student cohorts.

5.3. Future Research Direction

We aim to develop a conceptual framework addressing readiness for change system enhancement and large-scale educational transformation. Insights gained from this conceptual framework and empirical evidence will enhance our understanding of institutional and systemic improvement and readiness for change in an interconnected global context. Several critical questions remain open for discussion and future research:

- Do the proposed core constructs for individual and organizational readiness dimensions sufficiently capture the viable conceptualization of higher education systems' readiness for change?
- Are organizational and system readiness distinct or overlapping constructs? Should system readiness be considered an independent construct, or is it embedded within organizational readiness for change?
- How can we design robust instruments to measure and explore the interaction between individual and organizational readiness in diverse cultural contexts? How can we ensure methodologically sound research to establish legitimate cross-cultural knowledge connections? Are educators and higher education systems adequately prepared for change?

Applying cultural and cross-cultural perspectives presents clear advantages in articulating and connecting global knowledge bases. The primary aim of this conceptual paper is to introduce a framework for assessing the readiness for change, mainly focusing on final-year students. It also seeks to test the framework's application to evaluate and enhance readiness for change across diverse settings. This framework will be a foundation for facilitating institutional and systemic improvement discussions while guiding future research directions. Assessing readiness profiles for change across various HEIand systems is essential to

identifying strengths and weaknesses at individual, organizational, and systemic levels. Additionally, it is crucial to investigate how these factors influence the capacity to achieve systemic readiness for change. Rigorous and consistent qualitative and quantitative data collection methodologies across different cultural and geographic contexts will enable collaborative researchers to build large datasets and compare findings. Readiness profiles will provide empirical evidence to empower educators and institutional leaders to progress and build momentum for change. The strengths and weaknesses identified at individual, institutional, and systemic levels warrant further exploration. Triangulated findings and their interpretation will offer valuable insights into strategies for achieving systemic readiness for change. Validated multi-level frameworks and measurement tools can serve as diagnostic and developmental resources for higher education institutions. Ultimately, the goal is to assess, identify, and enhance the overall readiness of higher education systems to embrace change.

References

[1] F. Luthans and C. M. Youssef, 'Emerging Positive Organizational Behavior', *Journal of Management*, vol. 33, no. 3, pp. 321–349, Jun. 2007, doi: 10.1177/0149206307300814.

[2] A. S. Masten, 'Global Perspectives on Resilience in Children and Youth', *Child Development*, vol. 85, no. 1, pp. 6–20, Jan. 2014, doi: 10.1111/cdev.12205.

[3] A. Bandura, *Self-efficacy: The exercise of control*. Macmillan, 1997.

[4] P. A. Facione, 'Critical thinking: What it is and why it counts', *Insight assessment*, vol. 1, no. 1, pp. 1–23, 2011.

[5] A. A. Aji, J. A. Hamid, A. Hassan, and R. M. Rasdi, 'Effect of organizational cultures on lecturers psychological empowerment and organizational commitment: structural equation modeling approach', *IOSR Journal of Humanities and Social Science*, vol. 22, no. 2, pp. 71–82, 2017.

[6] E. H. Schein, *Organizational Culture and Leadership.*, 5th edition. New Jersey: John Wiley & Sons, Inc., 2017.

[7] S. T. Hannah, B. J. Avolio, F. Luthans, and P. D. Harms, 'Leadership efficacy: Review and future directions', *The leadership quarterly*, vol. 19, no. 6, pp. 669–692, 2008.

[8] G. Westerman, D. Bonnet, and A. McAfee, *Leading digital: Turning technology into business transformation*. Harvard Business Press, 2014. Accessed: Oct. 25, 2024. [Online].

[9] G. M. Spreitzer, 'Psychological, empowerment in the workplace: dimensions, measurement and validation.', *Academy of Management Journal*, vol. 38, no. 5, pp. 1442–1465, Oct. 1995, doi: 10.2307/256865.

[10] A. Bandura, 'Social Cognitive Theory: An Agentic Perspective', *Annu. Rev. Psychol.*, vol. 52, no. 1, pp. 1–26, Feb. 2001, doi: 10.1146/annurev.psych.52.1.1.

[11] M. Jiang, H. Wang, and M. Li, 'Linking empowering leadership and organizational citizenship behavior toward environment: The role of psychological ownership and future time perspective', *Frontiers in psychology*, vol. 10, p. 2612, 2019.

[12] C. S. Carver and M. F. Scheier, 'Optimism', in *Encyclopedia of Quality of Life and Well-Being Research*, F. Maggino, Ed., Cham: Springer International Publishing, 2023, pp. 4849–4854. doi: 10.1007/978-3-031-17299-1_2018.

[13] C. R. Snyder, D. B. Feldman, H. S. Shorey, and K. L. Rand, 'Hopeful choices: A school counselor's guide to hope theory', *Professional School Counseling*, vol. 5, no. 5, p. 298, 2002.

[14] J. O. Miranda and R. N. C. Cruz, 'Resilience mediates the relationship between optimism and well-being among Filipino university students', *Curr Psychol*, vol. 41, no. 5, pp. 3185–3194, May 2022, doi: 10.1007/s12144-020-00806-0.

[15] M. Dawson and J. A. Pooley, 'Resilience: The role of optimism, perceived parental autonomy support and perceived social support in first year university students', 2013, Accessed: Dec. 23, 2024. [Online]. Available: https://ro.ecu.edu.au/ecuworks2013/418/

[16] J. Danesh and M. Shahnazari, 'A structural relationship model for resilience, L2 learning motivation, and L2 proficiency at different proficiency levels', *Learning and Motivation*, vol. 72, p. 101636, 2020.

[17] A. Derakhshan, J.-M. Dewaele, and M. A. Noughabi, 'Modeling the contribution of resilience, well-being, and L2 grit to foreign language teaching enjoyment among Iranian English language teachers', *System*, vol. 109, p. 102890, 2022.

[18] M. Yu, H. Wang, and G. Xia, 'The review on the role of ambiguity of tolerance and resilience on students' engagement', *Frontiers in Psychology*, vol. 12, p. 828894, 2022.

[19] S. Yun, P. Hiver, and A. H. Al-Hoorie, 'Academic buoyancy: exploring learners'everyday resilience in the language classroom', *Studies in Second Language Acquisition*, vol. 40, no. 4, pp. 805–830, 2018.

[20] J. R. Fernandez, F. Llamas-Salguero, and M. Gutiérrez-Ortega, 'Revisión bibliográfica y evolución del término resilencia', *Revista Educativa Hekademos*, 2019.

[21] J. C. Spee, 'Transformation and Resilience at the University of Redlands', *Journal of Management Inquiry*, vol. 29, no. 2, pp. 139–144, Apr. 2020, doi: 10.1177/1056492619866262.

[22] C. Paunescu and R. Argatu, 'Critical functions in ensuring effective business continuity management. Evidence from Romanian companies', *Journal of Business Economics and Management*, vol. 21, no. 2, pp. 497–520, 2020.

[23] T. Andersson, M. Cäker, S. Tengblad, and M. Wickelgren, 'Building traits for organizational resilience through balancing organizational structures', *Scandinavian Journal of Management*, vol. 35, no. 1, pp. 36–45, 2019.

[24] P. Gantt, 'Maximizing multimedia for training purposes', *The Technology Source*, 1998.

[25] E. Callaway, 'iTunes university'better than the real thing', *New Scientist*, 2009.

[26] D. Fonseca, N. Martí, E. Redondo, I. Navarro, and A. Sánchez, 'Relationship between student profile, tool use, participation, and academic performance with the use of Augmented Reality technology for visualized architecture models', *Computers in human behavior*, vol. 31, pp. 434–445, 2014.

[27] H. Jo, 'From concerns to benefits: a comprehensive study of ChatGPT usage in education', *Int J Educ Technol High Educ*, vol. 21, no. 1, p. 35, Jun. 2024, doi: 10.1186/s41239-024-00471-4.

[28] H. U. Rahiman and R. Kodikal, 'Revolutionizing education: Artificial intelligence empowered learning in higher education', *Cogent Education*, vol. 11, no. 1, p. 2293431, Dec. 2024, doi: 10.1080/2331186X.2023.2293431.

[29] Helmiatin, A. Hidayat, and M. R. Kahar, 'Investigating the adoption of AI in higher education: a study of public universities in Indonesia', *Cogent Education*, vol. 11, no. 1, p. 2380175, Dec. 2024, doi: 10.1080/2331186X.2024.2380175.

[30] M. Pradana, H. P. Elisa, and S. Syarifuddin, 'Discussing ChatGPT in education: A literature review and bibliometric analysis', *Cogent Education*, vol. 10, no. 2, p. 2243134, Dec. 2023, doi: 10.1080/2331186X.2023.2243134.

[31] F. Pajares, 'Albert Bandura: biographical sketch'. 2004.

[32] D. H. Schunk, 'Self-Efficacy and Academic Motivation', *Educational Psychologist*, vol. 26, no. 3–4, pp. 207–231, Jun. 1991, doi: 10.1080/00461520.1991.9653133.

[33] J. S. Eccles and A. Wigfield, 'Motivational Beliefs, Values, and Goals', *Annu. Rev. Psychol.*, vol. 53, no. 1, pp. 109–132, Feb. 2002, doi: 10.1146/annurev.psych.53.100901.135153.

[34] S. Vermeiren, D. Duchatelet, and D. Gijbels, 'Assessing students' self-efficacy for negotiating during a role-play simulation of political decision-making. Taking student characteristics and simulation features into account', *Studies in Educational Evaluation*, vol. 72, p. 101124, 2022.

[35] G. Nasa, 'Academic self-efficacy: a reliable predictor of educational performances Prof. Hemant Lata Sharma', *British Journal of Education*, vol. 2, no. 3, pp. 57–64, 2014.

[36] E. L. Usher and F. Pajares, 'Sources of self-efficacy in mathematics: A validation study', *Contemporary educational psychology*, vol. 34, no. 1, pp. 89–101, 2009.

[37] D. Ansong, S. R. Eisensmith, M. Okumu, and G. A. Chowa, 'The importance of self-efficacy and educational aspirations for academic achievement in resource-limited countries: Evidence from Ghana', *Journal of adolescence*, vol. 70, pp. 13–23, 2019.

[38] W. Crain, *Theories of development: Concepts and applications*. Routledge, 2015.

[39] W. A. Umrani, S. M. M. Shah, P. A. Memon, and A. H. Samo, 'Organizational culture and business performance: An empirical investigation in the Pakistani context', *International Journal of Academic Research in Economics and Management Sciences*, vol. 6, no. 1, pp. 93–107, 2017.

[40] V. O. Akpa, O. U. Asikhia, and N. E. Nneji, 'Organizational culture and organizational performance: A review of literature', *International Journal of Advances in Engineering and Management*, vol. 3, no. 1, pp. 361–372, 2021.

[41] T. B. Long, V. Blok, and I. Coninx, 'Barriers to the adoption and diffusion of technological innovations for climate-smart agriculture in Europe: evidence from the Netherlands, France, Switzerland and Italy', *Journal of cleaner production*, vol. 112, pp. 9–21, 2016.

[42] L. S. Keong and O. Dastane, 'Building a sustainable competitive advantage for Multi-Level Marketing (MLM) firms: An empirical investigation of contributing factors', *Journal of Distribution Science*, vol. 17, no. 3, pp. 5–19, 2019.

[43] M. Igbaria and M. Tan, 'The consequences of information technology acceptance on subsequent individual performance', *Information & management*, vol. 32, no. 3, pp. 113–121, 1997.

[44] R. Beckley, M. A. Elliott, and J. M. Prickett, 'Closing the gap: information technology & the nonprofit sector', *Nonprofit world*, vol. 14, pp. 36–42, 1996.

[45] J. G. Mcnutt and K. M. Boland, 'Electronic Advocacy by Nonprofit Organizations in Social Welfare Policy', *Nonprofit and Voluntary Sector Quarterly*, vol. 28, no. 4, pp. 432–451, Dec. 1999, doi: 10.1177/0899764099284004.

[46] R. S. Mano, 'Information Technology, Adaptation and Innovation in Nonprofit Human Service Organizations', *Journal of Technology in Human Services*, vol. 27, no. 3, pp. 227–234, Aug. 2009, doi: 10.1080/15228830903093239.

[47] V. Indrasiene *et al.*, *Critical thinking in higher education and labour market*. Peter Lang International Academic Publishers, 2021.

[48] K. Rubenson, 'Adult education overview', 2010.

[49] C. P. Dwyer and A. Walsh, 'An exploratory quantitative case study of critical thinking development through adult distance learning', *Educational Technology Research and Development*, vol. 68, no. 1, pp. 17–35, 2020.

[50] S. B. Merriam, 'Adult education-adult learning, instruction and program planning', *International Encyclopedia of Education*, pp. 12–17, 2010.

[51] S. Brookfield, 'Adult cognition as a dimension of lifelong learning', in *Lifelong Learning*, Routledge, 2019, pp. 89–101.

[52] E. K. Kallio, *Development of adult thinking: Interdisciplinary perspectives on cognitive development and adult learning*. Routledge, 2020.

[53] D. R. Garrison, 'Critical thinking and adult education: a conceptual model for developing critical thinking in adult learners', *International Journal of Lifelong Education*, vol. 10, no. 4, pp. 287–303, Oct. 1991, doi: 10.1080/0260137910100403.

[54] K. Cameron and R. E. Quinn, 'Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework.', 1999.

[55] M. A. Almaiah *et al.*, 'Measuring institutions' adoption of artificial intelligence applications in online learning environments: integrating the innovation diffusion theory with technology adoption rate', *Electronics*, vol. 11, no. 20, p. 3291, 2022.

[56] J. C. Zagalaz, I. López Manrique, M. B. San Pedro Veledo, M. L. Zagalaz Sanchez, and C. Gonzalez Gonzalez de Mesa, 'The importance of the phoenix bird technique (resilience) in teacher training: CD-RISC scale validation', *Sustainability*, vol. 12, no. 3, p. 1002, 2020.

[57] S. H. Ameis, M.-C. Lai, B. H. Mulsant, and P. Szatmari, 'Coping, fostering resilience, and driving care innovation for autistic people and their families during the COVID-19 pandemic and beyond', *Molecular Autism*, vol. 11, no. 1, p. 61, Dec. 2020, doi: 10.1186/s13229-020-00365-y.

[58] C. H. Vinkers *et al.*, 'Stress resilience during the coronavirus pandemic', *European Neuropsychopharmacology*, vol. 35, pp. 12–16, 2020.

[59] J. Cleland, J. McKimm, R. Fuller, D. Taylor, J. Janczukowicz, and T. Gibbs, 'Adapting to the impact of COVID-19: Sharing stories, sharing practice', *Medical Teacher*, vol. 42, no. 7, pp. 772–775, Jul. 2020, doi: 10.1080/0142159X.2020.1757635.

[60] W. D. Killgore, E. C. Taylor, S. A. Cloonan, and N. S. Dailey, 'Psychological resilience during the COVID-19 lockdown', *Psychiatry research*, vol. 291, p. 113216, 2020.

[61] E. Giovannini, P. Benczur, F. Campolongo, J. Cariboni, and A. R. Manca, 'Time for transformative resilience: the COVID-19 emergency', Joint Research Centre, 2020. Accessed: Oct. 23, 2024. [Online]. Available: https://ideas.repec.org/p/ipt/iptwpa/jrc120489.html

[62] J. Dohaney, M. de Róiste, R. A. Salmon, and K. Sutherland, 'Benefits, barriers, and incentives for improved resilience to disruption in university teaching', *International Journal of Disaster Risk Reduction*, vol. 50, p. 101691, 2020.

[63] T. Jajuri, S. Hashim, M. N. Ali, and S. M. S. Abdullah, 'The implementation of Science, Technology, Engineering and Mathematics (STEM) activities and its effect on student's academic resilience', *Asia Pacific Journal of Educators and Education*, vol. 34, pp. 153–166, 2019.

[64] E. Vaquero, A. Urrea, and A. Mundet, 'Promoting resilience through technology, art and a child rights-based approach', *Revista de cercetare si interventie sociala*, vol. 45, p. 144, 2014.

[65] L. K. Kalyani, 'The role of technology in education: Enhancing learning outcomes and 21st century skills', *International Journal of Scientific Research in Modern Science and Technology*, vol. 3, no. 4, pp. 05–10, 2024.

[66] Y. Zhang, 'The effect of educational technology on EFL learners' self-efficacy', *Frontiers in Psychology*, vol. 13, p. 881301, 2022.

[67] J. Rappaport, 'Terms of empowerment/exemplars of prevention: Toward a theory for community psychology', *American J of Comm Psychol*, vol. 15, no. 2, pp. 121–148, Apr. 1987, doi: 10.1007/BF00919275.

[68] J. A. Conger and R. N. Kanungo, 'The Empowerment Process: Integrating Theory and Practice', *The Academy of Management Review*, vol. 13, no. 3, p. 471, Jul. 1988, doi: 10.2307/258093.

[69] K. W. Thomas and B. A. Velthouse, 'Cognitive Elements of Empowerment: An "Interpretive" Model of Intrinsic Task Motivation', *AMR*, vol. 15, no. 4, pp. 666–681, Oct. 1990, doi: 10.5465/amr.1990.4310926.

[70] M. T. Maynard, L. L. Gilson, and J. E. Mathieu, 'Empowerment—Fad or Fab? A Multilevel Review of the Past Two Decades of Research', *Journal of Management*, vol. 38, no. 4, pp. 1231–1281, Jul. 2012, doi: 10.1177/0149206312438773.

[71] D. A. Alkhodary, 'Exploring the Relationship between Organizational Culture and Well-Being of Educational Institutions in Jordan', *Administrative Sciences*, vol. 13, no. 3, Art. no. 3, Mar. 2023, doi: 10.3390/admsci13030092.

[72] N. K. Malhotra, *Marketing research: an applied prientation*. Pearson, 2020.

[73] N. Rai and B. Thapa, 'A Study on Purposive Sampling Method in Research', *Kathmandu: Kathmandu School of Law*, vol. 5, 2015.

[74] M. Siddique, M. S. Ali, N. Nasir, T. H. Awan, and A. Siddique, 'Resilience and self-efficacy: A correlational study of 10th grade chemistry students in Pakistan', *Multicultural Education*, vol. 7, no. 9, pp. 210–222, 2021.

[75] C. Chen, Y. Shen, Y. Zhu, F. Xiao, J. Zhang, and J. Ni, 'The Effect of Academic Adaptability on Learning Burnout Among College Students: The Mediating Effect of Self-Esteem and the Moderating Effect of Self-Efficacy', *PRBM*, vol. Volume 16, pp. 1615–1629, May 2023, doi: 10.2147/PRBM.S408591.

[76] E. Ahdhianto, H. Marsigit, and Y. Nurfauzi, 'Improving fifth-grade students' mathematical problem-solving and critical thinking skills using problem-based learning', *Universal Journal of Educational Research*, vol. 8, no. 5, pp. 2012–2021, 2020.

[77] L.-A. Hanna, S. Clerkin, M. Hall, R. Craig, and A. Hanna, 'The resilience of final-year pharmacy students and aspects of the course they found to be resilience-building', *Pharmacy*, vol. 10, no. 4, p. 84, 2022.

[78] R. Schwarzer, 'Generalized self-efficacy scale', *Measures in health psychology: A user's portfolio. Causal and control beliefs/Nfer-Nelson*, 1995,

[79] O. L. Liu, L. Frankel, and K. C. Roohr, 'Assessing Critical Thinking in Higher Education: Current State and Directions for Next-Generation Assessment', *ETS Research Report Series*, vol. 2014, no. 1, pp. 1–23, 2014, doi: 10.1002/ets2.12009.

[80] T. Wang, D. F. Olivier, and P. Chen, 'Creating individual and organizational readiness for change: conceptualization of system readiness for change in school education', *International Journal of Leadership in Education*, vol. 26, no. 6, pp. 1037–1061, Nov. 2023, doi: 10.1080/13603124.2020.1818131.

[81] R. E. Quinn, *Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework*. Jossey-Bass, 2011.

[82] N. Schillewaert, M. J. Ahearne, R. T. Frambach, and R. K. Moenaert, 'The adoption of information technology in the sales force', *Industrial marketing management*, vol. 34, no. 4, pp. 323–336, 2005.

[83] E. S. Kim, R. F. Dedrick, C. Cao, and J. M. Ferron, 'Multilevel Factor Analysis: Reporting Guidelines and a Review of Reporting Practices', *Multivariate Behavioral Research*, pp. 0–0, Oct. 2016, doi: 10.1080/00273171.2016.1228042.

[84] B. O. Muthén, 'Multilevel Covariance Structure Analysis', *Sociological Methods & Research*, vol. 22, no. 3, pp. 376–398, Feb. 1994, doi: 10.1177/0049124194022003006.

[85] J. F. Hair, 'Multivariate data analysis: An overview', *International encyclopedia of statistical science*, pp. 904–907, 2011.

[86] J. F. Hair, M. Sarstedt, L. Hopkins, and V. G. Kuppelwieser, 'Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research', *European business review*, vol. 26, no. 2, pp. 106–121, 2014.

[87] P. D. Bliese and C. A. Castro, 'Role clarity, work overload and organizational support: Multilevel evidence of the importance of support', *Work & Stress*, vol. 14, no. 1, pp. 65–73, Jan. 2000, doi: 10.1080/026783700417230.

[88] J. M. LeBreton and J. L. Senter, 'Answers to 20 questions about interrater reliability and interrater agreement', *Organizational Research Methods*, vol. 11, no. 4, pp. 815–852, Oct. 2008, doi: 10.1177/1094428106296642.

[89] L. R. James, R. G. Demaree, and G. Wolf, 'Estimating within-group interrater reliability with and without response bias.', *Journal of Applied Psychology*, vol. 69, no. 1, p. 85, 1984.

[90] J. S. Beer and K. N. Ochsner, 'Social cognition: A multi level analysis', *Brain research*, vol. 1079, no. 1, pp. 98–105, 2006.

[91] D. J. Emerson, J. F. Hair, and K. J. Smith, 'Psychological Distress, Burnout, and Business Student Turnover: The Role of Resilience as a Coping Mechanism', *Res High Educ*, vol. 64, no. 2, pp. 228–259, Mar. 2023, doi: 10.1007/s11162-022-09704-9.

[92] M. R. Kinanthi, N. Grasiaswaty, and Y. Tresnawaty, 'Resiliensi pada mahasiswa di Jakarta: Menilik peran komunitas', *Jurnal Persona*, vol. 9, no. 2, pp. 249–268, 2020.

[93] F. Olan, S. Liu, I. Neaga, H. Chen, and F. Nakpodia, 'How cultural impact on knowledge sharing contributes to organizational performance: Using the fsQCA approach', *Journal of Business Research*, vol. 94, pp. 313–319, 2019.

[94] J. Southworth, 'Bridging critical thinking and transformative learning: The role of perspective-taking', *Theory and Research in Education*, vol. 20, no. 1, pp. 44–63, Mar. 2022, doi: 10.1177/14778785221090853.

[95] T. Yunita, 'Self-Efficacy, Organizational Culture and Quality of Innovation Related to Student Sharing Knowledge', *INQUISITIVE : International Journal of Economic*, vol. 1, no. 2, Art. no. 2, Jun. 2021, doi: 10.35814/inquisitive.v1i2.2279.

[96] F. Sabouripour, S. Roslan, Z. Ghiami, and M. A. Memon, 'Mediating role of self-efficacy in the relationship between optimism, psychological well-being, and resilience among Iranian students', *Frontiers in psychology*, vol. 12, p. 675645, 2021.

[97] S. K. Khan, M. A. Memon, and T. Ramayah, 'Leadership and innovative culture influence on organisational citizenship behaviour and affective commitment: The mediating role of interactional justice', *International journal of business and society*, vol. 19, no. 3, pp. 725–747, 2018.

[98] A. J. Martin, H. G. Nejad, S. Colmar, and G. A. D. Liem, 'Adaptability: How students' responses to uncertainty and novelty predict their academic and non-academic outcomes.', *Journal of Educational Psychology*, vol. 105, no. 3, p. 728, 2013.

[99] Y. Wu, Z. Sang, X.-C. Zhang, and J. Margraf, 'The relationship between resilience and mental health in Chinese college students: a longitudinal cross-lagged analysis', *Frontiers in psychology*, vol. 11, p. 108, 2020.

[100] M. Ghasem and M. Hosseinchari, 'Psychological resilience and intrinsic–Extrinsic motivation: The mediating role of self-efficacy', 2012, Accessed: Dec. 24, 2024. [Online]. Available: https://www.sid.ir/fileserver/jf/78113913306

[101] J. A. Cody, 'The roles of stress appraisal and self-efficacy in fostering resilience to improve psychosocial outcomes following negative life events among college students: A multiple mediation analysis', 2013

[102] W. E. Hudson, *The relationship between academic self-efficacy and resilience to grades of students admitted under special criteria*. The Florida State University, 2007. Accessed: Dec. 24, 2024. [Online]. Available:

[103] S. Prakong, 'The Role of Critical Thinking in Enhancing Students' Problem-Solving Abilities in Higher Education', *Journal of Education, Humanities, and Social Research*, vol. 1, pp. 10–16, Dec. 2024, doi: 10.70088/scx8x622.

[104] J. B. Barney, 'Organizational Culture: Can It Be a Source of Sustained Competitive Advantage?', *The Academy of Management Review*, vol. 11, no. 3, p. 656, Jul. 1986, doi: 10.2307/258317.

[105] G. DeSanctis and M. S. Poole, 'Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory', *Organization Science*, vol. 5, no. 2, pp. 121–147, May 1994, doi: 10.1287/orsc.5.2.121.

[106] D. M. H. Kee and M. R. B. Rubel, 'Technology adaptation is on its way: the role of high involvement work practice', *IJBIR*, vol. 25, no. 1, p. 35, 2021, doi: 10.1504/IJBIR.2021.115011.

[107] I. Jácome and S. Chión, 'Psychological Empowerment and Job Stress in Higher Education Institutions in Ecuador', *PRBM*, vol. Volume 15, pp. 3297–3312, Nov. 2022, doi: 10.2147/PRBM.S381342.

[108] A. M. S. Mostafa, 'The mediating role of positive affect on the relationship between psychological empowerment and employee outcomes: A longitudinal study', in *Evidence-based HRM: A global forum for empirical scholarship*, Emerald Publishing Limited, 2017, pp. 266–282. Accessed: Dec. 24, 2024.

[109] L. Blaique, H. Ismail, T. P. Corbin Jr, and H. Aldabbas, 'Enhancing learning organizations through employee resilience: Investigating the mediating influence of psychological empowerment', *Journal of Workplace Learning*, 2024,

[110] A. Bandura, 'Social foundations of thought and action', *Englewood Cliffs, NJ*, vol. 1986, no. 23–28, p. 2, 1986.