Digital Empowerment for Administrative Staff in Private Higher Education Institutions

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Abstract: - This study aims to analyze if work flexibility mediates the relationships between technology leadership, digital skills, organizational culture, and digital adaptation of administrative staff in private Higher Education Institutions City of Bandung, Indonesia. This research is targeting 138 private higher education institutions. Of 1325 eligible administrative staff to be surveyed, 203 gave their response to the questionnaire. PLS-SEM was used to analyze the data collected. The findings suggest that technology leadership, digital skills, and organizational culture significantly affect the digital adaptation of administrative staff. Work flexibility mediates the impact of the three independent variables on digital adaptation. This research, however, has several limitations including sample limitation and baseline on the context of the private higher education institutions in Bandung's city. Recommendations would be to improve training a technology leader and digital skills and strengthen an organizational culture that supports innovative culture and work flexibility. Further research should broaden the scope of the sample and other factors in the context.

Key-Words: - Digital Empowerment, Technology Leadership, Digital Skills, Organizational Culture, Work Flexibility, Digital Adaptation of Administrative Staff.

1 Introduction

Recent years have seen higher education as the core of significant digital transformation, [1]. As private higher education institutions are an essential part of the higher education system, they are also subject to the impact of digital transformation. In such a situation, the key factor shaping the extent of digital transformation is the digital adaptation of administrative staff. Administrative staff is crucial in maintaining daily functioning as the backbone of educational institutions and is responsible for numerous administrative tasks.

Private higher education institutions in the city of Bandung have rapidly adapted to a digital transformation. With the development of information and communication technology, educators not only incorporate it into lectures, but practitioners also encourage the application of digital tools to and optimize administrative and management systems. Administrative staff are at the forefront of this transformation, and the figure highlights the challenge that goes further than just using digital tools and applications. It also requires the development of new skills relevant to the changing landscape of digital technology, [2].

In the context of digital transformation, work flexibility is crucial for private higher education institutions in Bandung. Indeed, given how rapidly technology evolves, it is crucial to have conditions that allow administrative staff to desirably adapt to changes in the place of work. Work flexibility incorporates time and workplace control, the ability to work using technology outside the workplace, and being competent in functioning in a remote cooperation model, [3]. High work flexibility allows adapting to the fast-changing job requirements while maintaining the work–life balance, [4]. Hence, it is justified to explore the ways by which work flexibility is managed in the current context to increase private higher education administrative staff's performance and well-being

as they work in an environment that continues to change.

While the advancements and constant shifts in digital transformation continue, it is also vital to recognize the role of particular factors, such as technology leadership, digital skills, and organizational culture, that impact administrative staff's capability to embrace and exhibit work flexibility. Technology leadership is defined by the leaders' capacity to comprehend and apply technology in their daily working environments and to manifest a strong strategic posture regarding how this technology is to be utilized in realizing the organization's objective, [5]. Digital leaders can promote technology as a mechanism for creativity and productivity within the digital landscape, [6].

Digital skills play a significant and essential role in enabling administrative staff to use technology, taking digital devices and programs into account, [7]. This also entails data analysis and the comprehension of digital technology trends. Additionally, organizational culture is a second crucial factor that layers upholds the appropriate conditions for fruitful digital adjustment, focusing on creativity and value, [8]. Simply put, it authorizes its members to experiment often and widely, learn quickly from other people's failures, and learn together. Though it is hard to refute the significance of this process, the academic approach is underdeveloped, and one requires a far-reaching comprehension of how factors influence the administrative staff's work flexibility in private HEIs. Thus, this is the purpose of the study: to examine how technology leadership, digital skills, and organizational culture affect administrative staff work flexibility in private HEIs in Bandung, Indonesia.

As the private higher education field is increasingly digitalized, the key areas of change management are digital adaptation and workforce flexibility among the administrative staff. The three aspects outlined above have a central influence on the ways private higher education institutions will embrace future challenges, shaping their readiness. Firstly, the role of technology leadership is essential in guiding the institutions to better adapt to changing technologies. Secondly, digital skills are an acute need among the administrative staff that is to work in an increasingly digitalized field. Finally, organizational culture promotes innovation and flexibility that allows the administrative staff to feel supported in the face of change. According to the latest research, a synergistic approach that covers three aspects in combination can create the conditions for positive changes in how private higher education institutions perform administrative work. Hence, according to the conducted research, they can become one of the essential elements in the transformation of the field of human resource practices within the paradigm of the digital era.

As this study focuses largely on private higher education institutions located within the city of Bandung, the various difficulties and certain opportunities that private higher education institutions in the city face and have faced implement a crucial aspect for a comprehensive understanding of the means by which private higher education institutions can make the most of the digital adaptation. Therefore, based on a detailed and holistic approach within the research it is possible to expect that the outcomes obtained in this study will serve as substantial for understanding and awareness of how private can make digital transformation better.

2 Literature Review

2.1 Digital Adaptation of Administrative Staff

Digital adaptation in higher education has become inevitable due to the severe changes brought by new technologies and altering models of learning. This approach encompasses working with digital tools, which range from immediate and direct use to teaching and learning activities. In this regard, digital adaptation produces opportunities for many institutions to expand their opportunities and reach and to improve their quality by offering education more affordable and accessible. Therefore, lower education is predestined to address the challenges of adoption and invest in better technologies and software. It could be possible to agree with [6] that digital adaptation is when technology is integrated into the operation and academics in an efficient and effective manner that supports students' learning and administrative work and the innovative spirit of differentiated research. In this regard, this point supports the growing focus on the utilization of technology by administrative staff to address challenges, [2]. Hence, better leadership is anticipated to push the process, as leaders may impose a distinct vision of how technology helps achieve goals and excites the staff to embrace changes, [5]. At the same time, the demands for digital skills continue to grow since administrative staff with better digital skills are assisted in adopting this and utilizing technology, especially in

digital software and data-ups, and remain up-to-date on these technology trends, [9]. This paper will describe the research on the context of digital adoptions of administrative staff members in private higher education institutions in Bandung.

2.2 Work Flexibility

Work flexibility is an essential practice in private higher education institutions for migrating digital transformation, and adjusting to the dynamism of the workspace in the connected world. [10], notes that work flexibility occurs when an individual has the autonomy to work remotely, and independently choose their work location, work schedule, and work-related tasks aided by technology through virtual collaboration. The integration of online teaching models and technological tools necessitates the more flexible work of administrative staff to conform to the demands of the students and faculty. [11], indicate that work flexibility allows workers to respond to work content changes and maintain work-life balance. However, reports indicate a high level of difficulty in implementing a flexible work environment, organizational policies, cultures and the state of technological infrastructure adversely affect this work trend, [12]. Organizational culture infinitely supports their workforce to provide solutions in innovative ways and create proactive work environments while competent organizational leaders push for ethical organizational cultures and policies that enhance work flexibility, [5]. Consequently, work flexibility is one salient theme in private higher education institutions in addressing digital transformation.

2.3 Technology Leadership

Technology leadership is essential for guiding the direction of digital transformation in private higher education institutions by emphasizing the critical role of leaders in ensuring technology use. [13], explains that good leadership requires an understanding of technology, and critical thinking about how to apply it innovatively and efficiently. A leader provides meaning and directs administrative staff to embrace new approaches and make changes. Since technology is constantly evolving, leaders need to be up-to-date with technological trends and how they can be used in higher education to maintain a competitive edge, [14]. [8], suggest that a typical competitive use of the technology is facilitating organizational operations and staff to adapt to its use. But technology leadership is not just about the technology per se, it is about the organizational culture. An open culture prepares for technological change and motivates digital adaptation by developing new ideas and working together and by increasing trust in the willingness of staff to change. So, in turn, technology leadership is not just about using technology but also about creating a culture that promotes digital adaptation.

2.4 Digital Skills

Considering the rapid change in private higher education institutions, digital skills stand out as a primary innovational foundation that will allow administrative staff members to operate within the framework of digital transformation significantly, [7]. The set of skills includes proficiency in various digital applications and tools, the ability to work with data and analysis, and extensive knowledge of current technology tendencies and novelties, [7]. Since the educational paradigm keeps evolving toward technological implementation, the administrative staff becomes the support line for academic operations, ensuring that the functioning of daily activities proceeds as intended, [15]. However, technical knowledge is not the only aspect that constitutes the matter the ability to adapt to frequent changes in technology and trends is a significant challenge, [15]. Besides, digital inequalities and the lack of resources afforded to some institutions impede faculties from developing necessary skills, [15]. Thus, promoting and prioritizing digital skills among administrative staff are recognized as core strategies for the efficient management of private higher education transformation.

2.5 Organizational Culture

The first supporting component is organizational culture, which refers to the values, norms, and beliefs that guide the actions of people within an organization, [8]. Organizational culture facilitates digital adaptation through the support of innovation and experimentation, contributing to people's desire to learn how to use new technological tools, [8]. It also affects people's attitudes to technology, with strong cultural tolerance for social interactions making people more willing to share their digital adaptation and knowledge, [12]. Based on this explanation, visionary leadership, adaptability, communication, and acknowledgment of adaptive efforts are vital to organizational culture, [16], [17], [18], [19]. In my understanding of the subject, organizational culture is the foundation of administrative staff digital adaptation in private HEIs.

2.6 Hypothesis

This study's hypothesis is based on the link between the participating variables. The dependent variable digital adaptation is "expected to be influenced by the independent variables" which are technology leadership, digital skills, and organizational culture. Additionally, work flexibility is a mediating variable that mediates the relation between independent variables and the dependent ones. Generally speaking, the independent variable impacts the dependent one directly, and work flexibility is mediatory in this impact. The conceptualization of this link is depicted in the diagram below. Figure 1 shows the Conceptual Framework of the Study. This framework illustrates the relationships between the various variables investigated in this study. The independent variables include Technology Leadership, Digital Skills, and Organizational Culture, which influence the dependent variables, namely Work Flexibility and Digital Adaptation. The arrows indicate the direction and nature of the relationships between these variables. This conceptual framework serves as a guide for analyzing data and interpreting research findings. The proposed hypotheses are as follows:

H1 : There is an Influence of Technology Leadership on Administrative Staff Digital Adaptation

H2 : There is an Influence of Digital Skills on Administrative Staff Digital Adaptation

H3 : There is an Influence of Organizational Culture on Administrative Staff Digital Adaptation

H4 : There is an Influence of Technology Leadership on Work Flexibility

H5 : There is an Influence of Digital Skills on Work Flexibility

H6 : There is an Influence of Organizational Culture on Work Flexibility

H7 : There is an Influence of Work Flexibility on Digital Adaptation

H8 : The Impact of Technology Leadership on the Digital Adaptation of Administrative Staff Can Be Mitigated by Work Flexibility

H9 : The Impact of Digital Skills on Administrative Staff's Digital Adaptation Can Be Mitigated by Work Flexibility

H10: The Impact of Organizational Culture on Administrative Staff's Digital Adaptation Can Be Mitigated by Work Flexibility
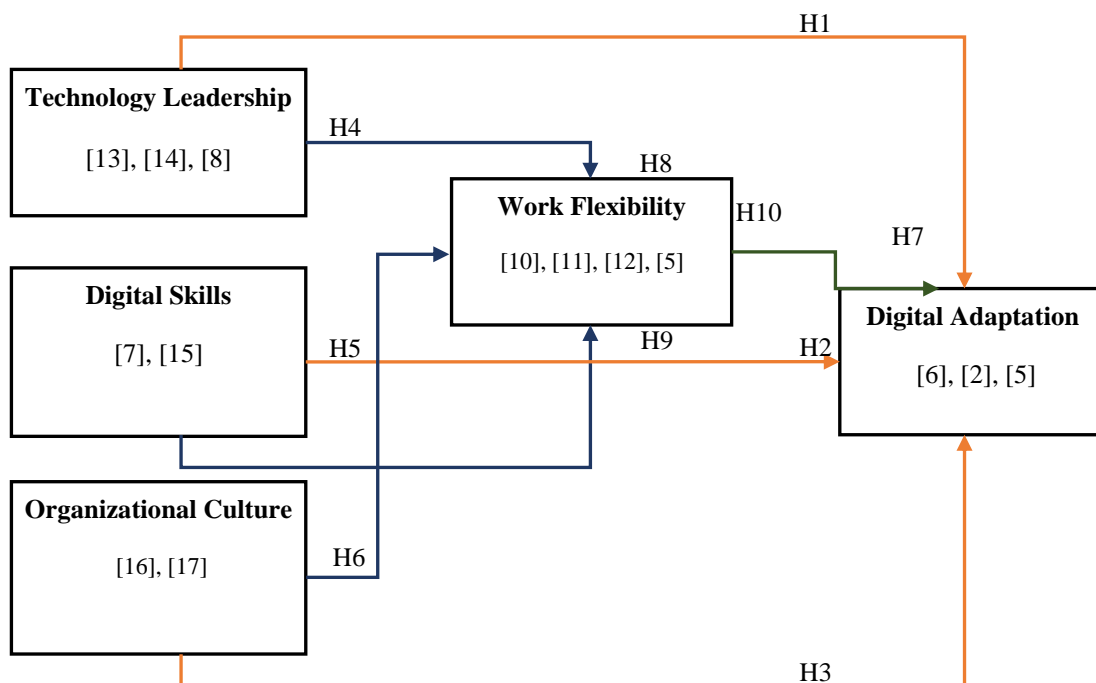

Fig. 1: Conceptual Framework of the Study

3 Research Methodology

The quantitative approach and primary data were conducted through questionnaires distributed to respondents on a scale. The target population was 414 employees coming from 138 private higher institutions in Bandung City, West Java, with a margin of error of 0.05. The research population was 203 respondents determined by Area Probability Sampling and Purposive sampling techniques. The respondents, who become the target of the study, are administrative staff on their functional levels in academic, financial, general administration, and human resource management departments in private higher institutions, [20]. Data analysis was carried out using PLS-SEM, with a level of significance set by a 0.05 margin of error. PLS-SEM was selected because it could analyze the model with a latent variable and was sensitive to small sample sizes. The analysis was carried out using Software SmartPLS 3.0. This research hopes to find out and provide details about the factors that influence digital adaptation and work flexibility for private higher institutions' administrative staff.

4 Results and Discussions

4.1 Data Analysis

4.1.1 Model Measurement

Based on the nature of measurement models of variables constructed through PLS-SEM, for instance, [21] argues that measurement instruments for each construct variable should be validated and improved. Moreover, they underscore that PLS-SEM provides the application of factor analysis techniques for evaluating constructs and internal consistency measurement by Cronbach's alpha. Meanwhile, [20] claims that discriminant and convergent validity testing are no less necessary since they verify the measurement model to ascertain the actual representation of construct variables and their theoretical origins.

Considering the research's context, the utilization of PLS-SEM can be anticipated to eliminate the difficulty of testing models with multidimensional constructs. For instance, technology leadership includes many factors that have to be measured, such as technology understanding, technology adoption, and digital competence, each requiring certainty and validity of measurement tools. Hence, when developing measurement models with PLS-SEM, the validation and reliability of the measurement instruments of the factors of each construct variable are expected to be the main target. Therefore, using

such an approach, the present research project is set to highly benefit the understanding of the factors of digital adaptation in the private higher education institution environment. The measures of the relationships between technology leadership, digital skills, and organizational culture, as well as work flexibility as a mediation factor of digital adaptation, can be seen in the diagram below. Figure 2 illustrates the outer model, depicting the relationships between indicators and latent variables in this study. The model outlines three independent variables: Technology Leadership (X1), Digital Skills (X2), and Organizational Culture (X3), along with two dependent variables: Work Flexibility (Z) and Digital Adaptation (Y). Each latent variable is measured by several indicators displayed on the left and right sides. The values shown on the lines between indicators and latent variables indicate the strength of the relationships (loading factors) between each indicator and its corresponding latent variable. This model aids in understanding the contribution of each indicator to the latent variable it represents. The operational variable of the study is depicted in Appendix 1 (Appendix).

4.1.2 Convergent Validity

[20], also state convergent validity as a crucial concept in research, where it refers to the measure of the degree to two or more measurement instruments are supposed to measure the same co-vary. It is the main interest of this research to validate that variables measured by various instruments are positively related. This is essential to ascertain that the numerous measurement instruments used in the study are sound and measure the same construct in the same way and direction as identified, [20]. According to [22], there is a concern about confirming convergent validity when using PLS-SEM in construct validation, and the findings of this study, will show that the measures are excellent and valid instruments for continuous constructs measuring.

As can be seen from Table 1, the results of the Outer Loadings calculations demonstrate uniformly high indicators above 0.7, which is consistent with expected benchmarks, [23]. This signifies the high degree to which each indicator affects relevant constructs, supporting the validity and dependability of the utilized measuring instruments, [20]. As a result, the findings presented above lay meaningful groundwork for assessing the patterns of relation between the variables outlined in the research conceptual model.
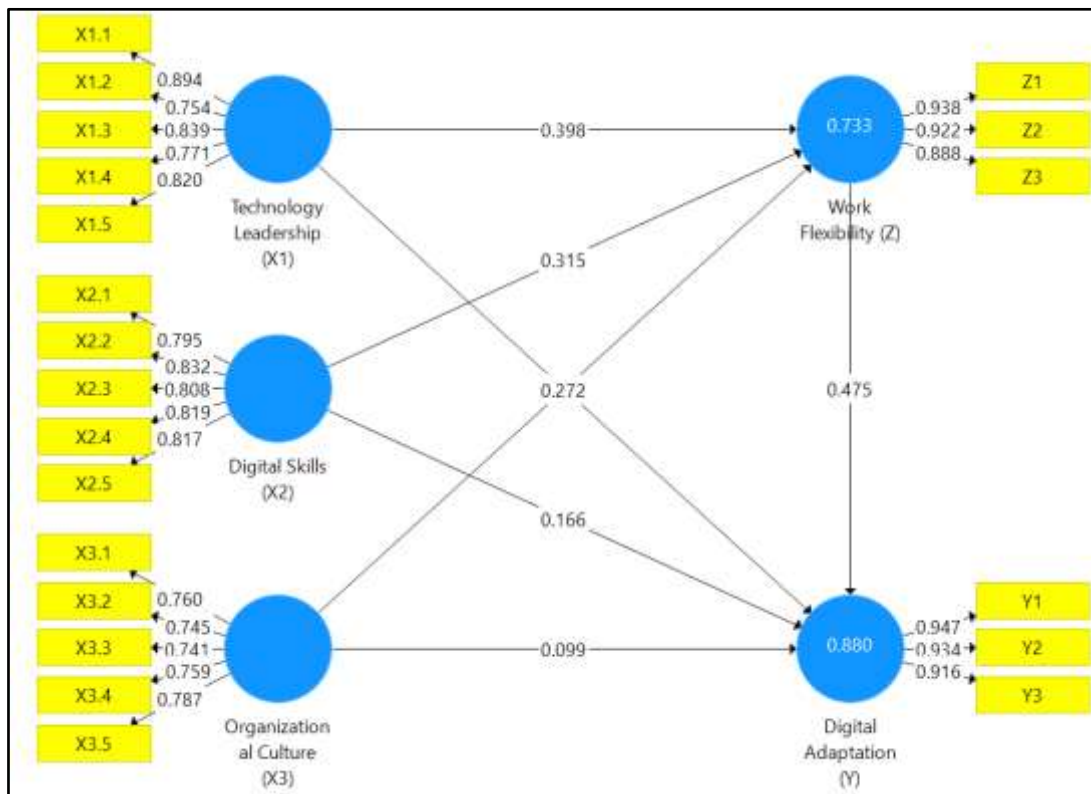
Fig. 2: Outer Model

Table 1. Factor Loading Values

Exogenous Constructs	Dimensions	Item Code	Loading Factor
Technology Leadership	Technology Vision	X1.1	0.894
	Technology Innovation and Adoption	X1.2	0.754
	Technology Skills	X1.3	0.839
	Technology Communication	X1.4	0.771
	Transformational Leadership	X1.5	0.820
Digital Skills	Digital Literacy	X2.1	0.795
	Information Management	X2.2	0.832
	Communication and Collaboration	X2.3	0.808
	Critical Thinking and Problem Solving	X2.4	0.819
	Creativity and Innovation	X2.5	0.817
Organizational Culture	Shared Values	X3.1	0.760
	Norms and Practices	X3.2	0.745
	Leadership Style	X3.3	0.741
	Communication Patterns	X3.4	0.759
	Adaptability and Change Orientation	X3.5	0.787
Work Flexibility	Temporal Flexibility	Z1	0.938
	Spatial Flexibility	Z2	0.922
	Task Flexibility	Z3	0.888
Exogenous Constructs	Dimensions	Item Code	Loading Factor
Digital Adaptation	Technological Proficiency	Y1	0.947
	Innovation Readiness	Y2	0.934
	Adaptive Behavior	Y3	0.916

4.1.3 Discriminant Validity

Another critical research concept is Discriminant Validity to be measured as the degree to which one construct behaves differently from another construct with which it should not correlate, [20]. As long as the results of this test are good, it can be stated that the instruments measure one construct separately from the other construct, proving the instruments' construct validity, [24]. By testing Discriminant Validity, the research confirms that the measured constructs are an accurate reflection of the relevant concepts, maintaining the processes' reliability applied in the present research. Therefore, the constructs measured in the developed model are good enough to guarantee that further analysis will be reliable and valuable.

In conclusion, the cross-loading measurement results in Table 2 show that every indicator substantially and consistently contributes to the measured constructs, which suggests successful achievement of discriminant validity. This fact means that the indicators utilized in the current study consistently perform well in measuring identified constructs, confirming the quality of measurement adopted in this research.

Consequently, the obtained cross-loading results give a robust guarantee for the reliability and meaningfulness of the constructs measured in the model. This evidence is vital for accurate and relevant analysis.

4.1.4 Composite Reliability

Composite reliability, which is an important measure in research models [20] is the measure of the consistency and precision of the indicators in capturing the intended construct, [24]. High composite reliability is thus indicative of the high consistency of the indicators measuring the same constructs and hence assured high reliability of the results obtained. High composite reliability is complemented by variants of internal reliability measures such as Cronbach's Alpha that measure values above which constructs' indicators are considered to be consistent, [25]. As such, high composite reliability and satisfactory values of Cronbach's Alpha are critical to helping achieve the reliability of the developed model and the accuracy of the data analysis results.

Table 2. Cross-Loading Values

	Technology Leadership (X1)	Digital Skills (X2)	Organizational Culture (X3)	Work Flexibility (Z)	Digital Adaptation (Y)
X1.1	**0.894**	0.631	0.454	0.682	0.777
X1.2	**0.754**	0.582	0.408	0.650	0.655
X1.3	**0.839**	0.533	0.422	0.606	0.670
X1.4	**0.771**	0.618	0.422	0.582	0.612
X1.5	**0.820**	0.630	0.443	0.628	0.701
X2.1	0.547	**0.795**	0.458	0.586	0.633
X2.2	0.696	**0.832**	0.461	0.662	0.696
X2.3	0.497	**0.808**	0.502	0.557	0.590
X2.4	0.666	**0.819**	0.571	0.696	0.706
X2.5	0.555	**0.817**	0.473	0.625	0.665
X3.1	0.383	0.408	**0.760**	0.504	0.487
X3.2	0.497	0.545	**0.745**	0.499	0.611
X3.3	0.370	0.434	**0.741**	0.535	0.508
X3.4	0.335	0.417	**0.759**	0.509	0.415
X3.5	0.396	0.482	**0.787**	0.502	0.523
Z1	0.720	0.715	0.706	**0.938**	0.838
Z2	0.700	0.731	0.614	**0.922**	0.792
Z3	0.702	0.675	0.526	**0.888**	0.845
Y1	0.792	0.781	0.758	0.851	**0.947**
Y2	0.763	0.801	0.604	0.898	**0.934**
Y3	0.795	0.681	0.520	0.763	**0.916**

Table 3. Construct Reliability and Validity

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Technology Leadership (X1)	0.874	0.909	0.668
Digital Skills (X2)	0.873	0.908	0.663
Organizational Culture (X3)	0.816	0.871	0.575
Work Flexibility (Z)	0.904	0.940	0.840
Digital Adaptation (Y)	0.925	0.952	0.869

The results of Construct Reliability and Validity measurements in Table 3, as presented above, show that the constructed Composite Reliability and Cronbach's Alpha values for all the constructs in the research model execute above 0.7. These constructs' high values point out that the measurements within the examined constructs have good internal consistency and reliability. Self-assuredly, the measurement usage for each construct's indicators collectively contributes considerably and consistently to the deliberate and proposed variables. Thus, the findings of Construct Reliability and Validity offer assurance that the model developed has an acceptable level of reliability and validity to further examine the relationships between the variables under consideration.

4.2 Structural Model Analysis

The structural model analysis is important for understanding variable relationships in the background. It is done using PLS-SEM to determine the strength and significance of relationships between constructs, [20]. The relationships between independent and dependent variables are direct or indirect if mediated in the case of a mediating construct. Furthermore, it is essential for the researcher to determine how the variables affect one another in the background, [22]. Figure 3 shows the inner model illustrating the relationships between the variables in this study. This model consists of three independent variables: Technology Leadership (X1), Digital Skills (X2), and Organizational Culture (X3), which influence two dependent variables: Work Flexibility (Z) and Digital Adaptation (Y). The paths connecting these variables reflect the strength and direction of their influence, with statistical values along the paths indicating the significance of these relationships. This model helps in understanding how each factor contributes to digital adaptation and work flexibility within the organization.
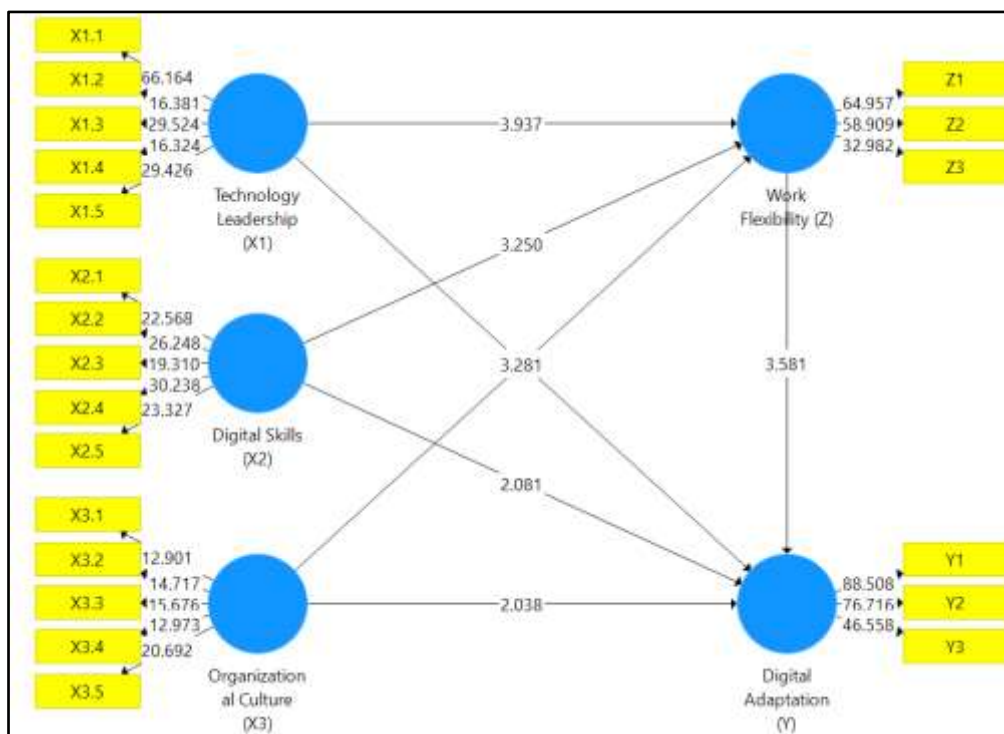

Fig. 3: Inner Model

4.2.1 R-Square (R2)

The R-Square in this analysis takes the approach to measure the effective uses of the structural model in explaining variations in the dependent variable using the independent variables included in the model, [26]. As such, it is an important measure of variation explained, [26]. More especially, a high R-Square value indicates good predictive properties, whereas a low R-Square value shows a poor predictive factor. R-Square thus is critical when considering the model fit and predictive properties, [20]. With a reasonable theoretical background, one can reasonably conclude about the accuracy of the model in explaining the variable relations in the context.

Table 4. R-Square (R^2)

	R Square	R Square Adjusted
Work Flexibility (Z)	0.733	0.729
Digital Adaptation (Y)	0.880	0.877

The R-Square Step 2 measurements in Table 4 show the proportion of the variation in the dependent variable explained by the independent variables in the model. The value for R-Square (R2) work flexibility as a mediating variable is 0.733. This value implies approximately 73.3% of the variation in dependent variables can be pinpointed to independent variables. This is an important reminder of the substantial contribution of Work Flexibility to the variation in the dependent variable. The value R-Square for digital adaptation is 0.880. This means approximately 88% of the variation in the dependent variable can be accounted for by the independent variables. The substantial value of R-Square for Digital Adaptation further proves this variable's importance in a variation of dependent variables in the context of research. These figures provide

critical information into the testing of the model to the representation of the relationship of the variables in the conceptual framework of the study.

The Results of the Hypothesis Testing

Table 5 analysis of Relationships Between the Independent Attributes (Technology Leadership, Digital Skills, and Organisational Culture) and The Dependent Attributes (Digital Adaptation and Work Flexibility), and the Relationship Between Work Flexibility and Digital Adaptation Details of the influence of each variable on the relationship between these variables are shown by coefficients in the discussions, and the significance and strength of the relationship in each study.

The Influence of Technology Leadership on Administrative Staff Digital Adaptation

As shown in the path analysis results, technology leadership significantly impacted administrative staff digital adaptation (O = 0.299, T statistics = 5.356, P values = 0.000). Clearly, leadership within the context of technology is vital to administrative staff regarding the accessibility to adapt to change digitally. The evidence from the existing study supports the above finding. As an example, the research by [27] demonstrates support for visionary leadership as a key enabling factor for digital transformation in all organizational sectors. Moreover, as revealed in the findings by [28], effective leadership can inspire and persuade employees to accept new technologies. The findings of such studies can be compared with the existing study as they all point to the significant role that leadership plays in influencing the digital adaptation among administrative staff of private higher education.

Table 5. Path Coefficients

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Technology Leadership (X1) -> Digital Adaptation (Y)	0.299	0.290	0.056	5.356	0.000
Digital Skills (X2) -> Digital Adaptation (Y)	0.166	0.163	0.080	2.081	0.038
Organizational Culture (X3) -> Digital Adaptation (Y)	0.099	0.099	0.048	2.038	0.042
Technology Leadership (X1) -> Work Flexibility (Z)	0.398	0.370	0.101	3.937	0.000
Digital Skills (X2) -> Work Flexibility (Z)	0.315	0.320	0.097	3.250	0.001
Organizational Culture (X3) -> Work Flexibility (Z)	0.272	0.298	0.083	3.281	0.001
Work Flexibility (Z) -> Digital Adaptation (Y)	0.475	0.483	0.133	3.581	0.000

The Influence of Digital Skills on Administrative Staff Digital Adaptation

As a result, the path analysis indicated a significant positive relationship between the digital skills of administrative staff and their adaptation, which can be expressed as a path coefficient of 0.166 (p < 0.05). In other words, the more developed the digital skills of administrative staff members, the more significant their adaptation. This result coincides with the conclusions of other researchers who explained that high digital skills exert a positive contribution to technology adaptation at the workplace, [9]. Alternatively, other research asserts that employees who have digital skills are more likely to be better at integrating new technology than those without digital knowledge, [7]. Consequently, these results support the need to implement programs to develop digital skills in order to promote the adaptation of administrative staff in various organizational spheres.

The Influence of Organizational Culture on Administrative Staff Digital Adaptation

The results of path analysis suggest that organizational culture has a significant positive effect on the digital adaptation of administrative staff. The path coefficient of 0.099 with T Statistics of 2.038 and a P-value of 0.042 reveal that an additional unit in organizational culture contributed to an increase in administrative staff's digital adaptation by 0.099 units. A similar result is consistent with other findings that show that organizational culture characterized by innovation and change orientation is conducive to digital adaptation in organizational life, [29]. The other study also reveals that a strong organizational culture of innovation and collaboration could be a critical success factor in the digital transformation of organizations, [30]. In this regard, the results demonstrate how the factor of organizational culture influences the adaptation of innovations in the administrative staff, which is in line with the aim of this research.

The Influence of Technology Leadership on Work Flexibility

According to the path analysis, Table 3 demonstrates that technology leadership is significantly and positively influencing work flexibility. Its path coefficient is 0.398 and its P Values is 0.000. It reveals that the work flexibility level in an organization is high when there is strong technology leadership. According to a [31] study, visionary leadership in a digital context can boost technology adoption across organizations.

Technology adoption and usage by employees may influence work flexibility. Therefore, the current finding supports the study's focus on the role of technology leadership in managing digital transformation and work flexibility among the administrative staff in teaching in private higher education. Additionally, according to the [32] finding, effective technology leadership leads to promoting an organizational culture that supports digital adaptation and innovation.

The Influence of Digital Skills on Work Flexibility

According to the path analysis results, there is a significant positive relationship between the digital skills variable and work flexibility. The path coefficient is 0.315, which is higher than the significant threshold. The T Statistics is 3.250, and the significance value is 0.001. This shows that the relationship is statistically significant. Such a result is cohesive with the previously reviewed studies as well as the conceptual framework. For example, [33] argues that strong digital skills help employees develop an adaptive capacity to new technologies and flexible work environments. Moreover, the findings by [34] further confirm this statement, as those people with good digital skills are likely to create a larger repertoire of flexible responses that they can access at will. Thus, the results support the idea that digital skill training is a proper strategy to develop the ability to be flexible at work in the context of digital changes.

The Influence of Organizational Culture on Work Flexibility

The path analysis results show that the path coefficient of organizational culture and employee work flexibility is 0.272, with a t-statistics of 3.281, and p-value of 0.001. This means that there is a high relationship between organizational culture and work flexibility, where a strong organizational culture increases the level of employee work flexibility. Moreover, other studies present similar reflections. For instance, the findings of the study by [35] reveal that an organizational culture that supports innovation and collaboration increases employee work flexibility. According to [36], an organizational culture that is open to change improves work flexibility by assisting employees to adjust to the dynamic work setting.

The Influence of Work Flexibility on Administrative Staff Digital Adaptation

The path analysis showed that the influence of Work Flexibility on the Administrative Staff's

Digital Adaptation was significantly positive, being 0.475 within the path coefficient. This data is fully aligned, and a T Statistics of 3.581, at p < 0.001, confirms the significance. This implies that the higher the work flexibility is, the higher levels of the digital adaptation of administrative staff members are. The results of the study imply that work flexibility is an essential factor in the extent to which the administrative staff can efficiently adjust to technological changes. It corresponds to the findings of the previous studies that proved the importance of work flexibility in employees' adaptation to changes in technologies and work processes cited in reference, [37]. Moreover, other studies suggest that work flexibility can also increase job satisfaction and the overall performance level of employees, which would create favorable conditions for the implementation of digital solutions in the organization cited in reference, [38].

Testing Mediation Effects
Testing the mediation effects using PLS-SEM is among the methods used to know the role of the mediating variable in the link between the independent and dependent variables. Testing the mediation effects using PLS-SEM takes different steps that achieve distinct tasks on mediation effects. These steps include; path analysis and mediation effects analysis. First, through path analysis, one can check the impact of the independent variable on the dependent variable. Second, the mediation effects analysis checks the effect of the independent variable on the mediating variable conceived as a path; while the effect of the mediating on the dependent variable conceived as a path b. The results of path analysis and path b analysis will be used to identify whether the mediating variable moderates or not the link between the independent and dependent variables. According to [18], their paper explained a sequence of detailed steps on how to conduct the path analysis on how to analyze the mediation effects using PLS-SEM. Therefore, the mentioned researcher and author illustrated the necessary steps needed to identify the significance of the mediation effects and interpret the result. Based on literature [22], which is focused on PLS-SEM, the bootstrapping method needs to be essential as the main step to generate the more accurate confidence limit on the estimation of the mediation effects.

Table 6 presents all direct, indirect robust and total effects of the independent variables on Digital Adaptation (Y) and Work Flexibility (Z) and significant relationships (p <. The results, thus, showcase that the themes of Technology Leadership, Digital Skills and Organizational Culture all have significant impacts on Digital Adaptation and Work Flexibility, further emphasizing their roles in influencing organizational dynamics and adaptability.

Furthermore, the analysis data for total effects indicate that all independent variables have a significant positive total influence on Administrative Staff Digital Adaptation. For Work Flexibility, the path coefficient, T Statistics value, and P Values are 0.475, 3.581, and 0.000. The O value is 0.594 and the path is strong and significant. The independent variables, Technology Leadership, Digital Skills, and Organizational Culture all have strong and significant path coefficients in the respective order in terms of O values with 0.610, 0.367, and 0.315 and significant T Statistics with sufficiently high values. The analysis results also demonstrate a significant positive total influence of Technology Leadership on Work Flexibility 0.398, 3.093, and 0.000. Digital Skills and Organizational Culture also have a significant positive tow influence on Work Flexibility with the first having an O Values of 0.315 and the second having an O value of 0.272, and strong path coefficients and significant T Statistics. Overall, the results of the study are consistent with existing literature supporting the critical role of technology leadership, digital skills, and organizational culture changes in supporting the digital adaptation of administrative staff. The results also demonstrate the close relationship between technology leadership, digital skills, organizational culture changes, and work flexibility in creating a conducive environment for the digital adaptation of workers.

Table 7 show the specific indirect effects result of Technology Leadership, Digital Skills, and Organizational Culture on Digital Adaptation (Y) through Work Flexibility (Z) This paper sheds light on the vital intermediary function of Work Flexibility in nurturing Digital Adaptation within organisational contexts, thereby providing a valuable insight into the effective means to enhancing organisations' agility.

Table 6. Total Effect

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Work Flexibility (Z) -> Digital Adaptation (Y)	0.475	0.483	0.133	3.581	0.000
Technology Leadership (X1) -> Digital Adaptation (Y)	0.488	0.470	0.074	6.637	0.000
Digital Skills (X2) -> Digital Adaptation (Y)	0.315	0.320	0.077	4.106	0.000
Organizational Culture (X3) -> Digital Adaptation (Y)	0.228	0.242	0.060	3.813	0.000
Technology Leadership (X1) -> Work Flexibility (Z)	0.398	0.370	0.101	3.937	0.000
Digital Skills (X2) -> Work Flexibility (Z)	0.315	0.320	0.097	3.250	0.001
Organizational Culture (X3) -> Work Flexibility (Z)	0.272	0.298	0.083	3.281	0.001

Table 7. Specific Indirect Effect

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Technology Leadership (X1) -> Work Flexibility (Z) -> Digital Adaptation (Y)	0.189	0.180	0.072	2.612	0.009
Digital Skills (X2) -> Work Flexibility (Z) -> Digital Adaptation (Y)	0.150	0.157	0.069	2.183	0.029
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Organizational Culture (X3) -> Work Flexibility (Z) -> Digital Adaptation (Y)	0.129	0.143	0.055	2.336	0.020

From the results of the specific indirect effect analysis, it is clear that work flexibility as a mediator in the association between technology leadership, digital skills, organizational culture, and the digital adaptation of the administrative staff is of great importance. All the indirect effects with a mediator of work flexibility are confirmed since technology leadership has a path coefficient of 0.189, T Statistics of 2.612, and P Values of 0.009. Similar results are obtained for digital skills and organizational culture, with path coefficients of 0.150, and 0.129, and T Statistics which confirms the significance. Therefore, work flexibility as a mediator is remediated for technology leadership, digital skills, and organizational culture. The research verifies that work flexibility is a mediator of the association between technology leadership, digital skills, and organizational culture and the digital adaptation of the administrative staff is highly relevant, and a supportive working environment is a powerful factor in facilitating technology adoption among administrative workers.

These results have been supported by previous research. For example, [39] studies demonstrated that leadership played an important role in workplace changes and innovations. Additionally, [19] research discussed the role of personal resources and job crafting behaviors in the job demands-resources model. They found that a work environment allowing flexibility could also significantly boost employees' well-being and performance. Moreover, Turel explored the impact of digital platforms on working arrangements, claiming that platform transparency should enable a focus on worker protection against potential job vulnerabilities, [37]. These findings indicate the possibilities of the given mediator, and work flexibility on digital adaptation of the administration staff in the given study.

5 Conclusion and Recommendation

To summarize, taking into account the research mentioned above and the developed hypotheses, it is possible to conclude that the digital adaptation variable is influenced by technology leadership, digital skills, and organizational culture. It can be said that technology leadership has the most direct effect, and digital skills and organizational culture are conditional variables through the mediation of work flexibility. Moreover, the latter has an important mediating role in the influence of technology leadership, digital skills, and organizational culture on the digital adaptation variable, which shows the importance of developing human resources that are sensitive and open to technological changes.

The findings above can be used to develop practical recommendations for organizations. First, it is necessary to acknowledge the importance of technology leadership. It can be achieved through creating conditions for expanding digital competencies among employees and fostering a more innovative and flexible organizational culture. For example, it is necessary to provide more training for employees to promote technology and digital skills. For instance, training is an effective method since it would make digital assimilation happen because workers are educated on how technology can make them more effective. It is also crucial to have an adaptable work environment as well, which will ensure there is sufficient collaboration experimentation, and learning opportunities for digital assimilation to take place. On the other hand, managers must offer workers more control over the length and location of their shifts. At present, these arrangements are described as flexible working hours and telework. Therefore, organizations will be able to become more adaptable, creative, and efficient in managing technological change by instituting remote work regulations and utilizing technology's appropriate features.

6 Research Limitations and Further Research

This research has provided certain insights into the impact of work flexibility, including technology leadership, digital skills, and organizational culture, on the digital adaptation of administrative staff in private universities. At the same time, several limitations should be acknowledged. Firstly, the subjects of this study are limited to private universities in Bandung, Indonesia, which implies that the generalizability of results can only be achieved within this setting and not be directly applied elsewhere. Secondly, the limitations of the samples used should also be recognized since this research encompasses only 203 respondents from 138 private universities. Thirdly, the limited investigation of the correlational nature of the analyzed variables cannot account for all possible variables contributing to the digital adaptation behavior. Thus, additional studies with a broader and more representative sample and more contextually relevant research can provide a more complete image of the matter.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the authors used ChatGPT in order to improve the readability and language of our manuscript. After using this tool/service, the authors reviewed and edited the content as needed and takes full responsibility for the content of the publication.

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APPENDIX

Appendix 1. Operational Variable

Variable	Definition	Code	Indicators	References
Technology Leadership	According to [13], "Technology Leadership" involves leaders' ability to understand, implement, and effectively leverage technology to achieve organizational goals, as well as the development of innovative strategies and the capability to motivate and facilitate team members in adopting new technologies.	X1.1	Have a clear vision concerning the utilization of technology to attain the organization's sustainability	Modified from [13], [14], [8]
		X1.2	Act as change agents in promoting creativity and adopting technology for enhancing the organization's performance and effectiveness	
		X1.3	Rate your ability to apprehend, utilize, and implement the latest technology to achieve the organization's sustainability	
		X1.4	Rate your ability to persuade and introduce technological ideas and approaches to team players and stakeholders	
		X1.5	How assured are you that the organization's senior members have a passion for encouraging and inspiring the team players to adopt and implement new technology?	
Digital Skills	According to [15], "Digital Skills" refer to the ability to confidently and efficiently use digital technology in different settings and situations. This entails familiarity with hardware and software, expertise in the use of digital applications and platforms, and competencies in digital communication, data handling, cybersecurity, and digital media knowledge. According to the literature review, digital skills are growing more necessary in the context of a networked digital world, where they can affect individuals' ability in the labor force and daily lives.	X2.1	How well do you understand and are able to use various digital applications and software in your work?	Modified from [7], [15]
		X2.2	How well do you manage and store digital information in your work?	
		X2.3	How well do you communicate and collaborate using digital technology in your work environment?	
		X2.4	The ability to think critically and solve problems using digital technology	
		X2.5	The ability to be creative and innovative in using digital technology	
Organizational Culture	According to [16], organizational culture encompasses the values, norms, and behaviors of its members, including how they treat employees, make decisions, and conduct interactions and collaborations within the organization	X3.1	At the organizational level, to what extent do you believe that shared values, such as integrity, honesty, or cooperation, are valued and applied in day-to-day activities?	Modified from [16], [17]
		X3.3	How often are the norms and practices within the organizational culture followed and practiced by the members of the organization?	
		X3.3	How often does the leadership style within the organization reflect the culture and values embedded in the organizational culture?	
		X3.4	How often do communication patterns within the organization reflect the culture and norms present in the organizational culture?	
		X3.5	To what extent is the organization flexible and open to change in facing new challenges and overcoming obstacles in the work environment?	
Work	According to [11], Work	Z1	To what extent do you feel you have flexibility in	Modified

Variable	Definition	Code	Indicators	References
Flexibility	Flexibility is the ability to adjust working hours, location, and style according to personal needs and preferences. It encompasses flexibility in time, work location, and the utilization of technology.		determining your own working hours?	from [11], [5], [10], [12]
			How often can you adjust your work schedule, such as choosing working hours that suit your personal preferences?	
			How frequently do you have the freedom to adjust your work hours according to other needs or obligations outside of work?	
			How often can you determine your own working hours, both in terms of starting and ending times?	
		Z2	To what extent do you feel you have flexibility to determine your workplace, both inside and outside the office?	
			How often are you given the opportunity to work from locations outside the office, such as from home or other places of your choice?	
			How often can you adjust your workplace environment inside the office according to your needs or preferences?	
			To what extent do you feel you have flexibility to work from different areas within the office, such as from shared workspaces or meeting rooms?	
		Z3	How often do you have flexibility in completing your tasks according to your own schedule and sequence?	
			To what extent can you choose the tasks you want to work on first based on priorities and needs?	
			How often can you adjust your work schedule to complete tasks with different deadlines?	
			How often are you given the freedom to determine the best way to complete a task, including using different tools and approaches?	
Digital Adaptation of Administrative Staff	According to [6], "Digital Adaptation of Administrative Staff" encompasses the process by which administrative staff develop their abilities to use digital technology to enhance their work efficiency. It involves adapting to technological changes and implementing new practices that leverage digital tools in the administrative work environment.	Y1	How confident are you in using software and digital applications for your administrative tasks?	Modified from [6], [2], [5]
			How well do you understand and operate the technology required for your administrative work?	
			How often do you use digital technology in performing your daily administrative tasks?	
			How extensive is your proficiency in using various software and digital applications used in the administrative work environment?	
			How quickly do you learn and adapt to new technologies introduced in your administrative work?	
			How confident are you in using advanced features of software and digital applications for your administrative tasks?	
		Y2	How open are you to trying out new digital tools or technologies in your administrative tasks?	
			To what extent do you actively seek out opportunities to learn and adopt new digital practices to enhance your administrative work?	
			How willing are you to experiment with different digital solutions to improve your efficiency in administrative tasks?	
			How confident are you in your ability to adapt to changes brought about by new digital	

Variable	Definition	Code	Indicators	References
			technologies in your administrative role?	
			How frequently do you engage in activities to enhance your digital skills and keep up with technological advancements relevant to your administrative tasks?	
			How prepared do you feel to embrace innovative digital solutions to address challenges or improve processes in your administrative work?	
		Y3	How frequently do you adjust your administrative methods to incorporate new digital tools or technologies?	
			To what extent are you willing to modify your administrative processes to accommodate technological changes?	
			How proactive are you in seeking out new digital solutions to streamline your administrative tasks?	
			How adaptable do you consider yourself to be when faced with changes in digital platforms or software used for administrative purposes?	
			How often do you modify your administrative workflows to align with evolving digital trends or best practices?	
			How comfortable are you in adapting to new digital workflows or procedures introduced in your administrative role?	

Conflict of Interest

In this research, all authors have no conflicts of interest related to both the funding institution and the researched subject.