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**Digital Transformation in the Public Sector: The Role of Leadership and Culture**

**(A Study of Civil Servants in the Statistics Indonesia)**

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**Abstract**

This study aims to determine the effect of digital transformational leadership and digital culture on digital transformation (study on Civil Servants at the Statistics Indonesia). This quantitative research was conducted on 430 civil servants. The sampling technique was non-probability (purposive) sampling. The research data were collected by survey using an electronic questionnaire in the form of Google Forms. The data were analyzed using SEM PLS analysis with the help of smart PLS. The results showed that both digital transformational leadership and digital culture have a significant and positive effect on digital transformation. In addition, digital culture as a mediating variable is proven to significantly influence the relationship between digital transformational leadership and digital transformation. Further research can investigate other factors that can influence, mediate, or moderate the digital transformation process.

**Keywords:** digital transformation, digital transformational leadership, digital culture, public sector

**1. Introduction**

Digitalization challenges many business sectors and organizations including the government sector. Digitalization has fundamentally disrupted markets, altered customer preferences and expectations, and changed work structures and employment arrangements (Hanelt et al., 2021). Digital transformation is forcing companies and industries to critically change their organization and adapt if they are to survive and succeed (Porfirio et al., 2021). As a result, organizations, especially the public sector, are encouraged to be adaptive to changing technological developments to meet government and customer demands.

Indonesia is one of the countries with high digital growth. In 2020, Indonesia will become the third country after China and Azerbaijan which is characterized by an economic country with limited digital infrastructure but is rapidly digitizing in the future (Chakravorti et al., 2020). Attention to digitalization is also reflected in the Strategic Priority Project (Major Project) of Indonesia's National Medium Term Development Plan (RPJMN) for the 2020-2024 period. One of the forty-one (41) priority projects that have leverage and impact on competitive advantage is building information and communication technology (ICT) infrastructure for digital

transformation. Statistics Indonesia is one of the government organizations participating in the development of digital transformation. This is reflected in the BPS Strategic Plan for the 2020-2024 period. Digital transformation is very important for BPS in supporting the organization's vision, namely "Provider of Quality Statistical Data for Advanced Indonesia". In addition, within the framework of national planning, BPS is mandated to guide the implementation of Indonesian data through the National Statistics System (SSN) for ministries, agencies, and the public.

Whatever form it takes, change is not an easy thing for an organization to implement. Some organizations may fail to transform. McKinsey and Co. (2018) show the transformation's success rate is less than 30%, and only 6% of organizations are successful. Twelve percent of respondents said that the organization's digital transformation could improve performance and encourage it to sustain the change in the long term, the rest did not feel the change would be sustainable. Many factors can be the reason why digital transformation can fail to be implemented in an organization. From the internal side of the organization, digital transformation must face the existing organizational culture because the transformation process needs to involve every function and all members of the organization (Hie B., 2019). From the external side of the organization, digital transformation needs to consider important aspects of change management such as successfully encouraging relevant stakeholders including customers to change the way they interact with the organization. In addition, public sector organizations still face many barriers such as lack of administrative skills, data availability, and environmental uncertainty related to public management in the public sector (Al Nuaimi et al., 2022). Therefore, digital transformation requires the support of human resources from both internal and external organization.

Hidiyanto et al in Waranggani News (2022) conducted a research publication stating that one of the driving factors of cloud computing adoption as a digital transformation of the public sector in Indonesia is the desire to innovate from the organization and support from the leadership. In its application, digital transformation requires complete coordination between organizational units played by the role of leaders. This process requires managerial aspects of leaders, namely being work-oriented to develop strategies to improve performance and utilize technology to drive digital transformation. In addition, leaders must be able to consider and understand the strengths, needs, and weaknesses of the organization's processes and resources. For example, along with the digital transformation process, leaders also have a role in managing different types of employees who have digital capacities and who are overwhelmed by technological developments. Therefore, it can be said that leadership is the key to successful transformation (Canterino et al., 2020; Kane et al., 2019).

The strengthening of human resources that can affect the success of the transformation is the formation of the behavior of organizational members reflected in their organizational culture. Organizational culture is a factor that can influence the effectiveness of companies in implementing digital technology (Martínez-Caro et al., 2020). For example, organizations with an adaptive culture can maintain sustainable innovation performance, which in turn can provide an organizational HR advantage to continue to survive in the face of changing challenges organization. Therefore, organizations need to cultivate an organizational culture that is

compatible with the changes of a digitally transformed organization. Research on digital culture can help identify factors that can influence digital transformation success.

This research is interesting to study because the Human Resources (HR) factor is very important for any change and development in the organization. This is because the leaders and employees are better at creating a digital culture that supports digital transformation will increase the effectiveness and efficiency of the changes decided in the organization. Therefore, this research aims to determine the effect of digital transformational leadership and digital transformation through digital culture.

## **Literatur Review**

### *Digital Organizational Culture*

Digital organizational culture is defined as a set of shared assumptions and understandings about the functioning of the organization in a digital context (Martínez-Caro et al., 2020). Since culture is settled and enduring, convincing members of the benefits of change is not enough to develop a digital culture. Organizations need to align and make adjustments between existing behaviors to reinforce the existence of digital culture. According to Schein (1985), organizational culture consists of:

- a. Artifacts include visible products (such as physical architecture, language, product technology, and organizational style), emotional displays (myths or stories about the organization), and also structural elements (such as how the organization works and organizational structure). Duerr et al. (2018) stated that in the digital era, organizational culture relies on new ways of collaboration both internally (e.g. physical and virtual collaboration) and externally (e.g. partner and customer platforms);
- b. Supported beliefs and values are described by espoused goals, ideals, norms, standards, and moral principles. For example, employees who resist changes in the use of digital when providing services to consumers will hinder transformation in the organization;
- c. Fundamental assumptions are beliefs that are taken for granted by every member of the organization sometimes unconsciously.

### *Digital Transformational Leadership*

Digital leadership is considered to be a combination of transformational leadership styles and technology (De Waal et al., 2016). Transformational leadership is necessary because of the more sophisticated demands faced by leaders and the high uncertainty experienced by leaders, followers, and the entire organization. This leadership changes followers' values to support organizational goals by building a climate of shared trust. Hughes et al. (2019) state that contingency theory is no longer important nor are situational or follower factors that have little impact. By demonstrating transformational leadership skills, a leader can achieve greater organizational change and performance. This is supported by transformational leaders who have four characteristics of leaders that support their effectiveness (Bass & Avolio, 1990), there are:

- a. Ideal influence or charismatic influence is an element of leaders so that they become role models who are respected, admired, and imitated by their followers.
- b. Motivational inspiration is carried out by leaders by building interactive communication with followers to motivate and inspire followers.

- c. Intellectual stimulation is done by leaders to make their followers more creative and innovative by encouraging followers to try approaches to rationality, gather followers' ideas, and provide creative solutions to problems.
- d. Individual consideration is done by leaders by giving more personal attention to followers based on the needs and desires of followers and empowering followers.

### *Digital Transformation*

Digital transformation is defined as the new use of digital technologies, such as mobile, artificial intelligence, cloud, blockchain, and Internet of Things (IoT) technologies, to enable business improvement, enhance customer experience, streamline operations, or create new businesses (Warner & Wager, 2019). This definition is in line with the argument expressed by Hess et al. (2016) where digital transformation is related to changes in digital technology, which results in changes in product or organizational structure or process automation. Digital transformation is characterized by three elements: 1) opening and redefining the boundaries of the company; 2) the opening of products and services to society and the reduction of property rights; and 3) reshaping the organization and product identity (Parmentier and Mangematin, 2014).

### **Hyphotesis Development**

Abrell-Vogel and Rowold (2014) explain that members will follow change-oriented values by imitating and learning the behavior of transformational leaders and accepting cultural initiatives to develop a psychological relationship with change. Transformational leadership can shape organizational policies, norms, or values that support digital transformation. A set of values articulated and reinforced by leaders can create or develop a new culture. Therefore the hypothesis in this study is as follows:

*H1: Digital transformational leadership has a positive effect on digital culture.*

Leadership is the key to successful transformation, particularly regarding the digital transformation of the organization (Weber et al., 2022). However, as organizations change over time, leadership orientation will also change and adapt. Organizations need to look for leaders who can support organizational digital transformation. Transformational leadership is considered to promote digital values and shift organizational belief systems to achieve organizational change such as digital transformation (Hining et al., 2018; Sainger 2018). Therefore the hypothesis in this study is as follows:

*H2: Digital transformational leadership has a positive effect on digital transformation.*

Organizational culture focuses on patterns of behavior, routines, and practices that emerge through the subjective and interpretative process of creating collective meanings achieved from social interactions resulting in stable patterns of thought and behavior across the organization and its members (Janicijevic, 2013). Digital organizational culture posits that this process occurs within the organization through interactions between its members. Therefore, organizational culture can facilitate the explanation of what factors and forms of reaction can influence the organization's reaction to change pressures from the environment to be able to assist the process of accepting and using transformation in the organization. Therefore the hypothesis in this study

is as follows:

*H3: Digital culture has a positive effect on digital transformation*

Transformational leadership is thought to influence the process of organizational change by stimulating new behaviors in those in the team who support digital transformation. Transformational leadership does not directly influence transformation but through the adaptation of existing or new values. Cultural mediation allows organizations to learn to find the best solutions, based on the situation of each company Alos-Simo et al. (2017). Therefore the hypothesis in this study is as follows:

*H4: Digital culture mediates the relationship between digital transformational leadership and digital transformation*

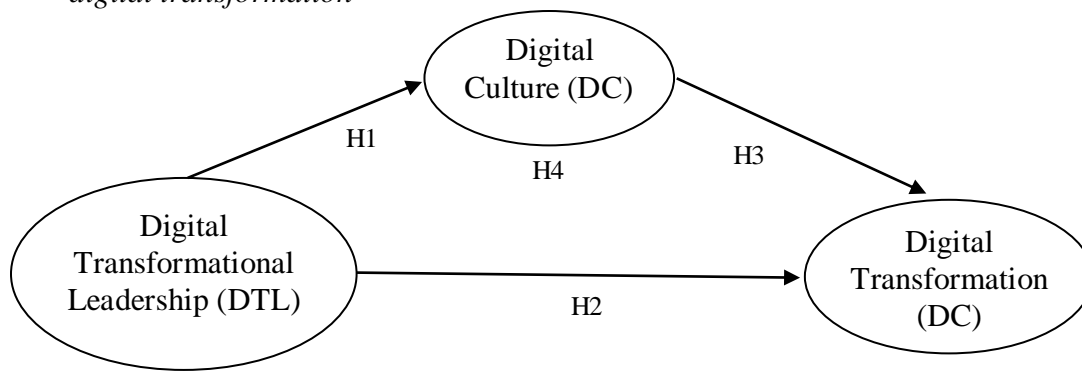


Figure 1. Research Framework

**Research Method**

The research was conducted with a quantitative approach to Indonesian public sector employees, Statistics Indonesia. The research uses cross-section data sourced from primary data from the distribution and filling of electronic questionnaires in the form of Google Forms. The online questionnaire was distributed by non-probability (purposive) sampling through the help of social media (WhatsApp). Four hundred and thirty (430) respondents filled out the questionnaire by self-enumeration. The variables of this study consist of digital transformational leadership (DTL), digital culture (DC), and digital transformation (DT) using questionnaire indicators derived from previous related research. The digital culture variable uses four indicators adopted from Cegarra-Navarro et al. (2016), digital transformational leadership variables using six indicators adopted from Chen and Chang (2013); Podsakoff et al. (1990); and Podsakoff et al. (1996), and digital transformation variables using four indicators adopted from AlNaumi et al. (2022); Nasiri et al. (2020). All variable indicators use 5 Likert scale answer options 1-5 including: (1) strongly disagree, (2) disagree less, (3) neutral, (4) agree, (5) strongly agree.

According to Hair et al (2019), SEM-PLS uses two measurement models. First, SEM-PLS uses the measurement model (outer model) by looking at the outer loading value, average variance extracted (AVE), composite reliability (CR), Cronbach's Alpha, and discriminant validity (cross-

Loading and Fornell-Larcker). Second, SEM-PLS uses and structural model (structural/inner model) by looking at the R- square value, partial test value, and t-statistic test.

**Results and Discussion**

Respondents consisted of 430 employees within Statistics Indonesia. 57% of respondents are Generation Y or millennial employees (born 1981 -1995); 51,4% are female; 70,23% have a bachelor's degree; 69,7% have certain functional positions; and 71,9% of employees are staff under the direction of the work unit coordinator. The characteristics of the general respondents are shown in Table 1 below.

Table 1. Respondent Profile (N=430)

<b>Variables</b>	<b>N</b>	<b>%</b>
<b>Gender:</b>		
1) Male	209	48,6
2) Women	221	51,4
<b>Year of Birth:</b>		
1) 1947-1964	3	0,7
2) 1965-1980	92	21,4
3) 1981-1995	245	57
4) > 1995	90	20,9
<b>Education:</b>		
1) High School and below	21	4,9
2) DI/DII/DIII	38	8,83
3) D4/SI	302	70,23
4) S2/S3	69	16,04
<b>Work Unit:</b>		
1) District/City	285	66,28
2) Province	91	21,16
3) Central/Pusdiklat/ Politeknik Statistika STIS	54	12,56
<b>Position:</b>		
1) General Functional	110	25,6
2) Specific Function	300	69,7
3) Structural Officials	20	4,7
<b>Position of Leader in the Work Unit:</b>		
1) Echelon 3/Coordinator	309	71,9
2) Echelon 2	118	27,4
3) Echelon 1	3	0,07

Source: Primary data processing, 2023

Before hypothesis testing, validity and reliability tests were carried out. Indicators are declared to meet convergent validity by looking at the outer loading value >0,700 and Average Variance Extracted (AVE) value >0,5 (Sekaran & Bougie, 2016). Convergent validity describes the extent



to which convergent constructs explain the variance of items. The AVE value of each variable has met the value  $>0,5$  which indicates that at least 50% of the variables in the study are explained by the construct so that it fulfills good convergent validity. The outer loading value of item DT2  $<0,7$ , namely 0,614 so that the item is declared invalid and removed from the model. The final results of outer loadings and AVE values can be seen in Table 2.

Table 2. Convergent Validity Test

<b>Variable</b>	<b>Items</b>	<b>Outer Loading</b>	<b>Information</b>
Digital Culture (AVE = 0.654)	DC1	0,848	Valid
	DC2	0,841	Valid
	DC3	0,774	Valid
	DC4	0,769	Valid
Digital Transformational Leadership (AVE = 0.784)	DTL1	0,894	Valid
	DTL2	0,910	Valid
	DTL3	0,895	Valid
	DTL4	0,895	Valid
	DTL5	0,886	Valid
	DTL6	0,830	Valid
Digital Transformation (AVE = 0.642)	DT1	0,755	Valid
	DT3	0,824	Valid
	DT4	0,799	Valid
	DT5	0,826	Valid

Source: Primary data processing, 2023

The discriminant validity value ensures that each structural model is different from the other as seen from the square root AVE value of the same structure must be greater than 0,7 and greater than the correlation value of the same construction. The discriminant validity test value shows that the square root of AVE (diagonal value of Fornell-Lacker Table 3) is  $>0,7$ . The AVE square root value between the same variables/constructs is also greater than the square root value between different constructs (Fornell-Larcker table Table 3). This shows that the research structure model has good discriminant validity variables. This is also supported by the discriminant validity test of research items seen from the cross-loading value between items and their constructs. The results of the item discriminant test (diagonal cross-loading value Table 3) produce a value that is much greater than the value of other constructs.

Table 3. Discriminant Validity Test

	<b>DC</b>	<b>DTL</b>	<b>DT</b>
<b>Fornell-Lacker</b>			
DC	<b>0,809</b>		
DTL	0,656	<b>0,885</b>	
DT	0,613	0,577	<b>0,801</b>
<b>Cross Loading</b>			
DC1	<b>0,848</b>	0,555	0,575
DC2	<b>0,841</b>	0,594	0,477
DC3	<b>0,774</b>	0,448	0,504
DC4	<b>0,769</b>	0,515	0,419
DTL1	0,580	<b>0,894</b>	0,521
DTL2	0,629	<b>0,910</b>	0,512
DTL3	0,570	<b>0,895</b>	0,530
DTL4	0,591	<b>0,895</b>	0,512
DTL5	0,589	<b>0,886</b>	0,527
DTL6	0,518	<b>0,830</b>	0,462
DT1	0,437	0,409	<b>0,755</b>
DT3	0,548	0,494	<b>0,824</b>
DT4	0,486	0,485	<b>0,799</b>
DT5	0,487	0,456	<b>0,826</b>

Source: Primary data processing, 2023

The reliability test in this research can be seen from the composite reliability value and Cronbach's Alpha. Table 4 shows the composite reliability value and Cronbach's Alpha >0,7 on all variables so that all research variables meet the reliability requirements.

Table 4. Reliability Test

<b>Variable</b>	<b>Composite Reliability</b>	<b>Cronbach's Alpha</b>	<b>Information</b>
Digital Culture	0,883	0,823	Reliable
Digital Transformational Leadership	0,956	0,945	Reliable
Digital Transformation	0,878	0,814	Reliable

Source: Primary data processing, 2023

Table 6 below shows that the Standardized Root Mean Residual (SRMR) value is 0,054 so the model is declared fit because the value is <0,1. The chi-square value also shows a value >0,05, which is 380,0554 so the data used in this study are considered identical to the theory used. The Normed Fit Index (NFI) value <0,9, which is 0,0907, indicates that the model used is good. Therefore, based on the SRMR, chi-square, and NFI values, it can be stated that this model is a fit.



Table 6. Model Test

	Saturated Model
SRMR	0,054
d ULS	0,304
d G	0,152
Chi-Square	380,0554
NFI	0,0907
<b>R-square</b>	
DC	0,43
DT	0,43

Source: Processed primary data, 2023

The R-square value in Table 5 is used to determine how much the exogenous variables can explain the endogenous variables. The greater of the R-square value means better model predicts the structural equation. Both digital culture and digital transformation variables have an R-square value of 0,43. This means that digital transformation can be explained by digital transformation leadership by 43% as well as digital culture can be explained by digital transformation leadership by 43%.

Table 7. Hypothesis Testing

<b>Direct Effect</b>					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P-values
DTL -> DC	0,656	0,659	0,031	21,324	0,000
DTL -> DT	0,308	0,308	0,051	5,982	0,000
DC -> DT	0,412	0,413	0,052	7,957	0,000
<b>Indirect Effect</b>					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P-values
DTL -> DC -> DT	0,270	0,272	0,038	7,176	0,000

Source: Processed primary data, 2023

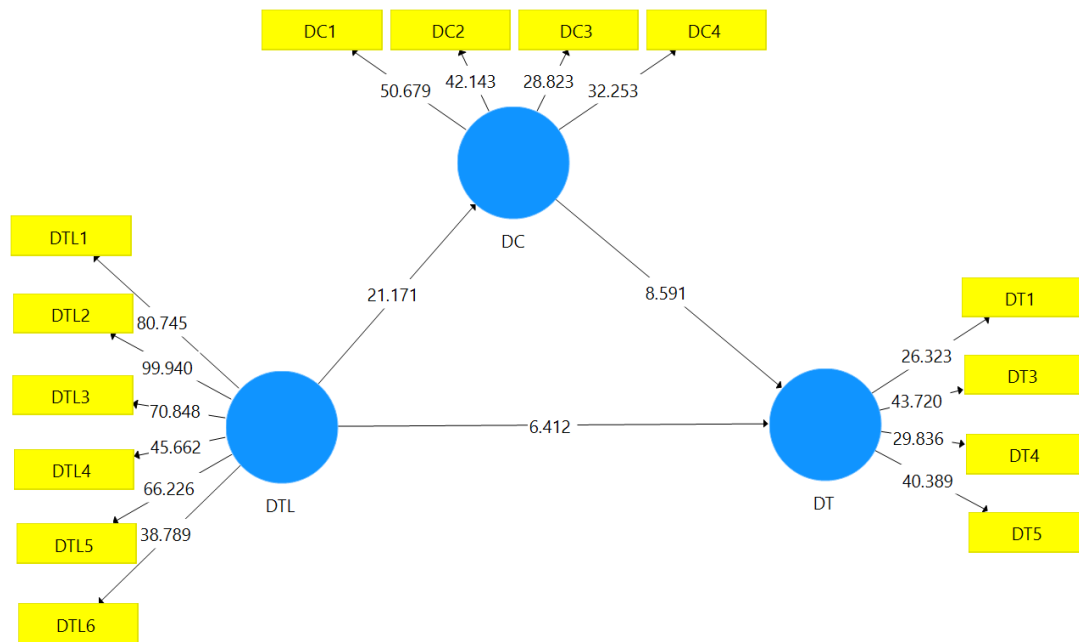


Figure 2. PLS-SEM Structure Model

The results of hypothesis testing are shown in Table 7 where the path coefficient uses a 5% significance level and has a table value of 1,96 for a 2-way hypothesis. The path coefficient is considered statistically different or significant if the p-value <0,05 or t- statistic > t-table.

Based on Table 7, the path coefficient value between the digital transformation leadership variable and digital culture has a t-statistic value of 21,324 (>1,96) and a p-value of 0,000 (<0,05) so it is declared significant with an original positive sample value of 0,656. Therefore, it can be concluded that digital transformation leadership has a positive and significant effect on digital culture at Statistics Indonesia, so hypothesis 1 (H1) is supported. These results are supported by previous research by Alos-Simo (2017) which concluded that transformational leadership has significantly positively influenced adaptive culture in e-business adoption research. Transformational leaders can encourage and develop members to adapt better to the environment and stimulate cultural implementation.

Based on Table 7, the path coefficient value between the digital transformational leadership variable and digital transformation has a t-statistic value of 5,982 (>1,96) and a p-value of 0,000 (<0,05) so that it is declared significant with an original positive sample value of 0,308. Therefore, it can be concluded that the leadership of digital transformation has a positive effect and is significant to digital transformation at Statistics Indonesia, so hypothesis 2 (H2) is supported. These results are supported by previous research by AlNaumi (2022) which concluded that digital transformational leadership has a positive effect on the digital transformation of the public sector in the capital of Abu Dhabi. Transformational leadership can be vainer in the face of high uncertainty because it has characteristics that support change in organizations, especially in the digital context.

Based on Table 7, the path coefficient value between the digital culture variable and digital transformation has a t-statistic value of 7,957 ( $>1,96$ ) and p-value of 0,000 ( $< 0.05$ ) so it is declared significant with an original positive sample value of 0,412. Therefore, it can be concluded that digital culture has a positive and significant effect on digital transformation at Statistics Indonesia, so hypothesis 3 (H3) is supported. This result is supported by previous research which states that digital organizational culture has a positive effect on business digitalization Martinez-Caro et al., (2020). The most important thing that companies must do in carrying out digital transformation is to change the culture (Hie, 2019). Having a culture that supports the organization in digital transformation makes the organization more effective and efficient in implementing it (Abhari, 2021).

Based on Table 7, the path coefficient value between the digital transformational leadership variable and digital transformation with digital culture as the medium has a t-statistic value of 7,176 ( $>1,96$ ) and a p-value of 0,000 ( $<0,05$ ) so it is declared significant with an original positive sample value of 0,270. Therefore, it can be concluded that digital culture positively mediates the relationship between digital transformational leadership and digital transformation at Statistics Indonesia so hypothesis 4 (H4) is supported. This result is supported by previous research by Kaur Bagga et al. (2022) who investigated the mediating role of organizational culture organization on the relationship between organizational leadership and change management in virtual teams. To see the type of mediation of digital culture, VAF (variance accounted for) is used by dividing the indirect effect by the effect value so that the VAF value is 0.467. Hair et al (2012) state that if the VAF value is  $> 20\%$  but  $< 80\%$  indicates partial mediation. Digital culture partially mediates the relationship between digital transformational leadership and digital transformation. Transformational leaders can help run digital transformation in organizations by forming cultural values that support these changes.

### **Conclusions and Suggestions**

This study obtained several conclusions. First, digital transformational leadership has a significant and positive effect on digital transformation in employees within Statistics Indonesia. Second, digital culture has a significant and positive effect on digital transformation. Third, digital culture is proven to mediate the relationship between digital transformational leadership and digital culture.

A limitation of this study is the purposive sampling method. Although the purposive method is cost and time efficient, the distribution of data is difficult to know. BPS employees are spread to districts and cities throughout Indonesia, so there may be differences in the perceptions of employees in remote areas far from the BPS center. Future research can use a sampling method that can facilitate employees' opinions on digital transformation from various BPS work units. In addition, future research can also examine other variables that can affect digital transformation such as organizational agility. The practical implication of this research shows that human resource factors through leaders and culture creation can influence the digital transformation process at Statistics Indonesia.

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