

Digital Leadership Competencies and Their Impact on the Effectiveness of Agricultural Training Services Delivery

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Abstract- Agricultural training services play an important role in supporting farmers by improving their knowledge, skills, and access to new technologies. As digital transformation continues to influence public service delivery, the way leadership supports the use of digital tools has become increasingly relevant in improving training effectiveness. This study aims to assess the digital leadership competencies practiced within the Agricultural Training Division of a national government agency in Central Luzon and to examine their impact on the effectiveness of agricultural training service delivery. Using a descriptive-correlational research design, data were collected through structured survey questionnaires administered to personnel involved in training implementation, extension services, and program management. The study focused on six digital leadership competencies: embracing digital, facilitating the digital drive, digital adaptiveness and resilience, cultivating a digital culture, digital skills, and digital competitive intelligence. It examined how these competencies relate to key training outcomes such as innovation, communication, accessibility, and overall service delivery. The findings show that respondents generally reported high levels of digital leadership competencies, and most of these competencies are positively related to training outcomes. Among the six competencies, embracing digital significantly affects training effectiveness when all variables are considered together. This suggests that the willingness of leaders to adopt and utilize digital technologies plays a more direct role in improving training outcomes. The findings highlight the importance of leadership mindset, alongside technical and organizational capacity, in strengthening the delivery of agricultural training within digital environments.

Index Terms - Digital Leadership Competency, Digital Transformation, Agricultural Training Services

I. INTRODUCTION

In the agricultural sector, training services are significant for equipping farmers with the knowledge

and skills necessary for sustainable development. In the Philippines, these services are a cornerstone of rural development, helping farmers adopt new technologies through structured training, and field demonstrations. Such interventions are essential for enhancing productivity, promoting sustainable farming practices, improving food security, and fostering climate resilience and rural empowerment (Inutan et al., 2025). With the rapid advancement of digital technologies, government agencies are undergoing significant transformation in how they deliver public services. Digital transformation involves significant changes in organizational processes, roles, and service delivery, enhancing efficiency, transparency, and responsiveness (Mergel et al., 2019; Parviainen et al., 2017). In this context, digital leadership in the public sector has emerged as a key factor in ensuring that digital transformation efforts align with public values and enhance service accessibility and quality (Kusanke et al., 2023).

Digital leadership requires leaders to develop new competencies that enable them to manage technological innovation, encourage digital adoption, and support employees in navigating digital transformation (Larjovuori et al., 2018). Within agricultural institutions, these competencies are particularly important in ensuring that digital tools, online learning platforms, and technology-enabled training programs are effectively utilized to enhance the delivery of agricultural training services. Despite the growing recognition of digital leadership in public sector transformation, limited empirical research has examined how digital leadership competencies influence the effectiveness of agricultural training service delivery within government agencies in the Philippines. This research gap is particularly significant in Central Luzon, one of the country's major agricultural regions, where national government

agencies play a key role in providing training programs that support farmers and agricultural stakeholders.

This study examines the digital leadership competencies practiced within a national government agency in Central Luzon and investigates how these competencies influence the effectiveness of agricultural training service delivery. The research adopts the six digital leadership competencies identified by Munsamy et al. (2023), namely: *Embracing Digital*, which reflects leaders' openness to technological innovation; *Facilitating the Digital Drive*, which focuses on guiding and supporting digital initiatives within the organization; *Digital Adaptiveness and Resilience*, which emphasizes the ability to respond effectively to technological changes; *Cultivating a Digital Culture*, which encourages collaboration and continuous digital learning; *Digital Skills*, referring to the technical knowledge and digital literacy required to implement digital initiatives; and *Digital Competitive Intelligence*, which involves anticipating technological trends and utilizing digital insights to improve organizational performance.

By examining these competencies, the study seeks to determine how digital leadership contributes to the effectiveness of agricultural training service delivery.

Specifically, it aims to:

- Describe the demographic profile of the respondents in terms of age, gender, educational attainment and years in service;
- Assess the level of digital leadership competencies practiced within the agency in terms of embracing digital, facilitating the digital drive, digital adaptiveness and resilience, cultivating a digital culture, digital skills, and digital competitive intelligence;
- Analyze the impact of digital leadership competencies on the effectiveness of agricultural training service delivery.

The findings are expected to provide valuable insights that can help strengthen digital leadership practices, enhance training program delivery, and support the

continued digital transformation of agricultural institutions.

II. METHODOLOGY

Research Design

This study employed a descriptive-correlational research design to examine the digital leadership competencies practiced within a national government agency in Central Luzon that provides agricultural training services and to determine how these competencies influence the effectiveness of agricultural training service delivery. The descriptive design was used to describe the respondents' demographic characteristics and assess the level of digital leadership competencies practiced within the agency, including embracing digital, facilitating the digital drive, digital adaptiveness and resilience, cultivating a digital culture, digital skills, and digital competitive intelligence. While the correlational component was used to examine the relationship between digital leadership competencies and the effectiveness of agricultural training service delivery, determining the extent to which these competencies are associated with differences in the perceived effectiveness of training services.

Respondents/Participants

The respondents of this study were personnel from a selected national government agency in Central Luzon involved in the implementation and delivery of agricultural training services. These participants include individuals engaged in training management, agricultural extension, technical support, and program implementation.

A purposive sampling technique was employed to select respondents who possess relevant knowledge and experience regarding the use of digital technologies and leadership practices within the agency. Participants were chosen based on their direct involvement in planning, coordinating, facilitating, or managing agricultural training programs, which enabled them to provide informed insights on digital leadership competencies and the effectiveness of training service delivery.

Data Gathering Tools and Techniques

Data for this study were collected using a structured survey questionnaire developed based on existing validated instruments on digital leadership competencies. The instrument was adapted from the framework proposed by Munsamy et al. (2023), which identifies six key digital leadership competencies: embracing digital, facilitating the digital drive, digital adaptiveness and resilience, cultivating a digital culture, digital skills, and digital competitive intelligence.

The questionnaire includes items designed to explore various dimensions of digital leadership competencies, gather demographic information, assess perceived effectiveness, and identify challenges in implementing digital leadership. Responses were measured using a seven-point Likert scale, with 1 representing “Strongly Disagree” and 7 representing “Strongly Agree.” The survey was administered online through Google Forms for accessibility and ease of distribution.

Statistical Tools and Method of Analysis

The collected data were analyzed using appropriate descriptive and inferential statistical methods aligned with the objectives of the study. Frequencies and percentages were used to describe the demographic profile of the respondents and to summarize the challenges encountered in implementing digital leadership practices. The mean and standard deviation were computed to determine the level of digital leadership competencies practiced within the agency and to assess the perceived effectiveness of agricultural training service delivery.

To examine the influence of digital leadership competencies on the effectiveness of agricultural training service delivery, correlation and regression analysis were employed. These statistical techniques allowed the researcher to determine the extent to which digital leadership competencies are associated with and contribute to the effectiveness of agricultural training services.

III. RESULTS AND DISCUSSION

Descriptive statistics and correlational analysis were utilized to summarize and analyze the results based on the responses of 36 personnel from the Agricultural Training Division of a national government agency in Central Luzon.

A. Demographic Profile of Respondents

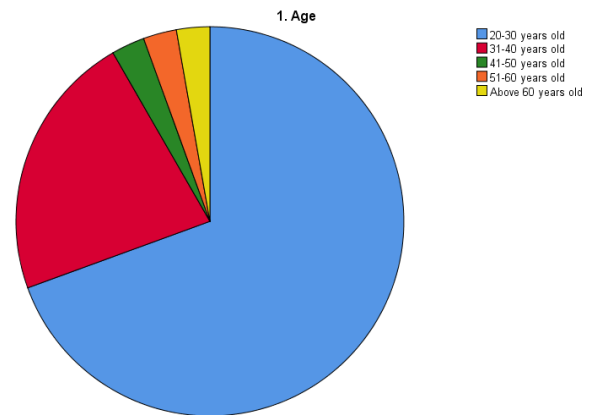


Figure 1. Age Distribution of Respondents

The demographic analysis reveals a predominantly young workforce within the division, with 25 out of 36 respondents (69.4%) falling within the 20-30 years age bracket. This represents a significant majority of younger professionals who are likely more adaptable to digital technologies and innovation. The remaining respondents are distributed across older age groups: 8 respondents (22.2%) aged 31-40 years, and only 3 respondents (8.3%) aged above 40 years. This age distribution suggests that the agency has a workforce that is naturally inclined toward digital adoption, which could be advantageous for implementing digital leadership practices. This finding supports prior research indicating that younger employees in government agencies exhibit greater digital readiness and adaptability, leading to faster digital adoption and lower resistance to technological change (Bhaskar et al., 2022).

Gender Composition

The gender distribution shows a relatively balanced representation with a slight female majority. Nineteen

respondents (52.8%) identified as female, while 17 (47.2%) identified as male. A balanced gender representation is crucial for effective digital leadership, as it promotes diverse viewpoints and minimizes gender-related barriers to technology adoption (Amoussouhoui et al., 2024).

Educational Background

The educational profile demonstrates a highly qualified workforce, with 31 respondents (86.1%) holding Bachelor's degrees and 5 respondents (13.9%) possessing Master's degrees. Notably, no respondents reported having Doctorate degrees. This educational background offers a strong foundation for grasping and applying digital leadership principles, as higher education often provides technological exposure and analytical skills, aligning with Nikou et al. (2021) findings that higher educational attainment is positively associated with digital literacy and technology acceptance.

Length of Service

The service tenure analysis reveals that the majority of respondents are relatively new to the agency, with 28 out of 36 (77.8%) having less than 5 years of service. Six respondents (16.7%) have 5-10 years of experience, while only 2 respondents (5.6%) have more than 15 years of service. This pattern suggests a recently recruited workforce that may be more open to change and digital innovation, though it also indicates limited institutional experience in traditional practices.

B. Digital Leadership Competencies

The descriptive statistics summarize the level of digital leadership competencies practiced within the agency across six key dimensions. All variables were measured using a 7-point Likert scale, where higher mean values indicate stronger agreement and higher levels of competency.

Descriptive Statistics						
	A. Embracing Digital	B. Leadership Facilitating the Digital Drive	C. Digital Adaptiveness and Resilience	D. Cultivating a Digital Culture	E. Digital Skills	F. Digital Competitive Intelligence
Mean	5.889	6.022	6.130	5.806	6.039	5.708
Median	6.000	6.000	6.000	6.000	6.000	5.833
Mode	6.0	6.0	6.0	6.0	6.0	5.5
Std. Deviation	.6836	.5166	.7529	.7772	.5733	.6916
Variance	.467	.267	.567	.604	.329	.478

Table 1. Descriptive Statistics for Digital Leadership Competencies of Respondents

Table 1 presents the summary of the descriptive statistics for the six competencies of digital leadership. The responses for the digital leadership competency *Embracing Digital* indicate that employees generally demonstrate a high level of engagement with digital technologies, as reflected in the mean score of 5.89. The median and mode were both 6.00 (“Agree”), while the standard deviation of 0.68 shows that responses were moderately consistent. Nevertheless, a small proportion of respondents reported lower ratings, suggesting that disparities in digital confidence remain. This underscores the importance of targeted interventions to improve digital readiness, as Zhan and Xie (2025) emphasize that while employees are generally receptive to digital change, there is still a need to enhance the effectiveness of digital technologies, particularly through training or coaching sessions aimed at increasing digital literacy among government employees.

The findings for the competency *Leadership Facilitating the Digital Drive* show a clear and consistent agreement among respondents on the role of leadership in advancing digital transformation. With a mean score of 6.02, employees generally view leadership as effective in guiding and supporting digital initiatives. Both the median and mode are 6.00 (“Agree”), and the low standard deviation (0.52) indicates that responses are closely aligned. These results indicate that leadership is seen as actively supporting digital change through clear direction, practical use of technology, and inclusive decision-making. This supports the findings of Kusanke et al. (2023), who note that successful digital transformation depends on leaders who combine technical knowledge, strategic thinking, and interpersonal skills. Similarly, Zhou et al. (2024) point out that leadership

plays an important role in encouraging collaboration and strengthening organizational reputation in support of digital efforts.

The results for *Digital Adaptiveness and Resilience* reflect a strong and positive assessment of employees' ability to adjust to digital tools and handle change. The mean score of 6.13 suggests that most respondents agreed or strongly agreed with statements related to adaptability. The median and mode are both 6.00, while the standard deviation of 0.75 shows some variation but with responses still concentrated on the higher end. These findings suggest that the workforce is generally well-prepared for digital transformation, showing flexibility and awareness of the demands of a technology-driven environment. This is consistent with Zhan and Li (2024), who found that digital transformation strengthens organizational resilience, particularly when continuous learning and adaptation are present.

For *Cultivating a Digital Culture*, the results remain positive but slightly lower compared to other dimensions. The mean score of 5.81 indicates general agreement with efforts to build a supportive digital environment. The median and mode are both 6.00, suggesting that most respondents lean toward agreement, while the standard deviation of 0.78 reflects moderate variation in responses. These results suggest that while initiatives to build a digital culture are recognized, progress is still uneven and ongoing. This aligns with Butt et al. (2024), who explain that cultural change tends to take longer than adopting digital tools because it involves shifts in mindset, behavior, and sustained leadership effort over time.

The findings for *Digital Skills* show that respondents generally consider themselves capable in using digital tools relevant to their work. The mean score is 6.04, with both the median and mode at 6.00, indicating that most participants selected "Agree." The standard deviation of 0.57 suggests that responses are fairly consistent across the group. These results are in line with Calderón et al. (2022), who found that self-confidence plays a strong role in how individuals assess their own digital skills, often leading to higher perceived competence regardless of actual skill level.

This may help explain why many respondents rated their capabilities positively.

The results for *Digital Competitive Intelligence* show that respondents generally see themselves as moderately to highly capable of using digital information to support decision-making and maintain competitiveness. The mean score of 5.70, along with a median and mode of 6.00, indicates that many respondents selected "Agree." However, the higher standard deviation of 0.99 suggests more variation in responses compared to other areas. This variation implies that while some individuals are confident in using digital insights, others may have less experience or find it more challenging to interpret and apply such information. This observation is supported by Sadeghiani et al. (2022), who note that differences in experience and analytical ability can influence how effectively individuals use digital intelligence.

Generally, the presence of a relatively young and educated workforce, together with strong leadership support, appears to create favorable conditions for digital transformation. While implementation is generally strong, further attention to strengthening digital culture and improving the use of external digital insights may enhance the agency's overall digital leadership and improve the delivery of agricultural training services.

C. Impact of Digital Leadership Competencies on the Training Effectiveness

Table 2. Descriptive Statistics of Digital Leadership Competencies on Training Effectiveness

Indicator	Mean	Std. Deviation	Variance
Enhancement of Training Delivery	6.06	1.068	1.140
Communication and Coordination Efficiency	6.36	.683	.466
Training Accessibility	6.28	.779	.606
Promotion of Innovation in Agricultural Services	6.42	.692	.479
Improvement of Training Outcomes	6.08	.841	.707

The results indicate a strong level of agreement among respondents regarding the positive impact of digital leadership on agricultural training. All five indicators yielded high mean scores, showing that respondents consistently view digital leadership as an important factor in improving the quality and effectiveness of training services.

Among the indicators, *Promotion of Innovation in Agricultural Services* gained the highest mean score, with a mean of 6.42, standard deviation of 0.692, and variance of 0.479. This suggests a strong and consistent view that digital leadership supports innovation in agricultural services. The relatively low standard deviation indicates close agreement among respondents, suggesting that digital leadership encourages the use of modern technologies and supports continuous improvement in practices. This finding is in line with previous studies, which note that digital leadership helps organizations adapt more easily and integrate digital tools into their operations (Bellis et al., 2024). In the same way, studies in the agri-food sector show that leadership plays an important role in digital transformation, leading to better organizational performance (Zhai et al., 2026).

Communication and Coordination Efficiency followed, with a mean of 6.36, standard deviation of 0.683, and variance of 0.466. The high mean and low variability indicate that respondents share a similar view on the usefulness of digital tools in improving communication and coordination. This suggests that digital platforms help make information sharing more efficient and support better coordination among staff involved in training activities. This shows that digital technologies improve collaboration, information exchange, and coordination among stakeholders in agricultural systems (OECD, 2021).

The indicator on *Training Accessibility*, with a mean of 6.28, standard deviation of 0.779, and variance of 0.606, also shows general agreement among respondents. The findings suggest that digital platforms have helped expand access to training programs, especially through online and technology-based methods. Although the standard deviation is slightly higher, the responses still point to a positive overall perception. This is consistent with studies

showing that digital media and e-learning platforms help reach a wider audience in agricultural education and training (Stampfl et al., 2025). However, some studies also point out that issues such as limited internet access and lack of infrastructure can still affect equal access to these opportunities (Bampasidou, 2024).

Improvement of Training Outcomes and Enhancement of Training Delivery also recorded high mean scores, at 6.08 and 6.06, respectively. However, these indicators showed higher standard deviations, especially in training delivery, which had a standard deviation of 1.068 and variance of 1.140. This suggests that while respondents generally see positive effects, their experiences are more varied in these areas. This difference may be related to factors such as digital skills, availability of technology, and how training programs are implemented in different settings. This explanation is supported by studies indicating that the success of digital agriculture initiatives depends on user skills, training approaches, and local conditions (Arangur, 2025). In addition, differences in technology use and user ability can affect how consistent the results are across different groups (Manzoor et al., 2025).

Collectively, the findings show that respondents widely recognize the positive contributions of digital leadership to agricultural training. The generally low standard deviations indicate a high level of agreement, although some areas, such as training delivery and outcomes, may still need improvement. These results suggest the need for continued support in terms of skills development, better access to digital tools, and more inclusive policies to ensure that the benefits of digital transformation are experienced more evenly.

Table 3. Correlation Between Digital Leadership Competencies and Training Effectiveness

		Correlations					
		Embracing Digital	Leadership Facilitating the Digital Drive	Digital Adaptiveness and Resilience	Cultivating a Digital Culture	Digital Skills	Digital Competitive Intelligence
Training Effectiveness	Pearson Correlation	.586**	.604**	.357	.412*	.468**	.213
	Sig. (2-tailed)	.000	.000	.032	.013	.004	.212
** . Correlation is significant at the 0.01 level (2-tailed).							
* . Correlation is significant at the 0.05 level (2-tailed).							

The Pearson correlation analysis was used to examine the relationship between digital leadership competencies and the effectiveness of agricultural training service delivery. The results show positive relationships of varying strength with several variables found to be statistically significant.

Among the competencies, *Embracing Digital* ($r = 0.586, p = 0.000$) showed a moderate positive and statistically significant relationship with training effectiveness. This indicates that leaders who are open to using digital technologies tend to support better training outcomes, improved access, and more effective delivery. The result suggests that readiness to adopt digital approaches plays an important role in improving training services. This finding is supported by previous research, which explains that digital leadership involves setting a clear direction for digital transformation and helping organizations integrate technology into learning environments, leading to improved learning experiences and performance (Obied, 2025).

Leadership Facilitating the Digital Drive ($r = 0.604, p = 0.000$) showed the strongest relationship with training effectiveness. This suggests that when leaders actively support, guide, and align digital initiatives, training services are more effective. The result points to the importance of leadership involvement in ensuring that digital efforts are properly implemented. It also shows that having digital tools alone is not enough but how leaders manage and support their use are more significant. This is consistent with studies showing that digital leadership helps align goals, resources, and practices, which improves learning outcomes and overall performance (Chaidr et al., 2025).

In contrast, *Digital Adaptiveness and Resilience* ($r = 0.357, p = 0.032$) showed a weaker but still statistically significant relationship. This suggests that the ability to adjust to digital changes supports training effectiveness, but its direct effect is not as strong. Adaptability appears to help create conditions where digital initiatives can work, rather than directly improving training outcomes. This is supported by literature indicating that while digital transformation improves flexibility, its success still depends on

leadership direction and how well it is applied within the organization (Obied, 2025).

Similarly, *Cultivating a Digital Culture* ($r = 0.412, p = 0.013$) showed a moderate and significant relationship with training effectiveness. This indicates that a work environment that supports collaboration, knowledge sharing, and continuous learning contributes to better training outcomes. However, its effect appears to be less direct compared to leadership actions. Previous studies note that digital leadership helps build a culture that supports collaboration and shared learning, which in turn improves training environments and outcomes (Obied, 2025).

Digital Skills ($r = 0.468, p = 0.004$) also showed a moderate and statistically significant relationship with training effectiveness. This suggests that the technical ability of personnel plays an important role in delivering effective training. When staff have stronger digital skills, they are better able to use digital platforms, manage training activities, and engage participants. The success of digital training depends largely on users' ability to effectively use digital tools and platforms (Stampfl et al., 2025).

On the other hand, *Digital Competitive Intelligence* ($r = 0.213, p = 0.212$) showed a weak relationship with training effectiveness. This suggests that while monitoring digital trends and external developments is important for planning, it does not have a direct effect on training delivery in this context. Its influence may be more long-term and less visible in daily training activities. This is supported by studies indicating that training effectiveness is more closely related to how training is designed and delivered, as well as how participants engage, rather than broader strategic functions (Paul et al., 2024).

In general, the findings show that digital leadership competencies are related to the effectiveness of agricultural training service delivery, especially those connected to leadership support, openness to digital tools, and technical skills. Competencies such as adaptability and digital culture appear to support these processes, while digital competitive intelligence shows limited direct influence in this setting.

Table 4. Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics		Sig. F Change	
						F Change	df1		df2
1	.688 ^a	.474	.365	.5319	.474	4.348	6	29	.003

a. Predictors: (Constant), Digital Competitive Intelligence, Embracing Digital, Cultivating a Digital Culture, Leadership Facilitating the Digital Drive, Digital Adaptiveness and Resilience, Digital Skills

As shown on Table 4, the regression analysis was used to determine the extent to which digital leadership competencies explain variations in agricultural training effectiveness. The model produced an R value of 0.688 and an R² of 0.474, indicating that about 47.4% of the variation in training effectiveness can be explained by the six competencies included in the model. The adjusted R² of 0.365 shows that, after accounting for the number of predictors, around 36.5% of the variation remains explained. The standard error of estimate at 0.5319 suggests that the model has an acceptable level of prediction accuracy. These results indicate that the model has a moderate level of explanatory power, although a substantial portion of the variation is still influenced by other factors not included in the analysis, such as infrastructure, training design, and participant-related conditions.

Table 5. ANOVA Results

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.381	6	1.230	4.348	.003 ^b
	Residual	8.205	29	.283		
	Total	15.586	35			

a. Dependent Variable: Training Effectiveness
 b. Predictors: (Constant), Digital Competitive Intelligence, Embracing Digital, Cultivating a Digital Culture, Leadership Facilitating the Digital Drive, Digital Adaptiveness and Resilience, Digital Skills

The ANOVA results as shown in Table 5 further support the usefulness of the model, with $F(6, 29) = 4.348$ and $p = 0.003$. This shows that the set of digital leadership competencies, when considered together, significantly predicts training effectiveness. In other words, digital leadership, as a group of related competencies, has a measurable relationship with how training services perform.

Table 6. Regression Coefficients

Model		Coefficients ^a				
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.335	1.158		1.153	.258
	Embracing Digital	.427	.197	.438	2.163	.039
	Leadership Facilitating the Digital Drive	.582	.287	.451	2.026	.052
	Digital Adaptiveness and Resilience	-.311	.192	-.351	-1.621	.116
	Cultivating a Digital Culture	.095	.195	.110	.486	.631
	Digital Skills	.093	.281	.080	.330	.744
	Digital Competitive Intelligence	-.057	.152	-.059	-.372	.712

a. Dependent Variable: Training Effectiveness

As shown in Table 6, when examining the individual predictors, only embracing digital was found to have a statistically significant effect on training effectiveness ($B = 0.427$, $\beta = 0.438$, $p = 0.039$). This indicates that an increase in openness to digital technologies is associated with an increase in training effectiveness, even when other variables are taken into account. The result suggests that the mindset of leaders toward digital transformation plays a direct role in shaping training outcomes. Leaders who are more willing to adopt and use digital tools are more likely to support improvements in training delivery and access.

Leadership facilitating the digital drive showed the strongest effect size ($B = 0.582$, $\beta = 0.451$), although it did not reach the conventional level of statistical significance ($p = 0.052$). Despite this, the result is very close to the threshold and suggests that leadership support, guidance, and alignment of digital efforts still play an important role in practice. The finding indicates that while leadership actions matter, their effect may overlap with other related variables, particularly those linked to digital mindset.

In contrast, digital adaptiveness and resilience did not show a significant effect ($B = -0.311$, $\beta = -0.351$, $p = 0.116$). The negative coefficient, although not statistically meaningful, may reflect overlap with stronger predictors in the model. This suggests that the ability to adjust to digital changes, on its own, does not directly improve training effectiveness but may work alongside other competencies. A similar pattern is observed for cultivating a digital culture ($B = 0.095$, $\beta = 0.110$, $p = 0.631$), which did not show a significant effect when other variables were considered. This

implies that while a supportive work environment is beneficial, its influence may be indirect rather than directly measurable in training outcomes. Digital skills also did not emerge as a significant predictor in the regression model ($B = 0.093$, $\beta = 0.080$, $p = 0.744$), despite showing a significant relationship in the correlation analysis. This suggests that while technical skills are important, they may not independently explain training effectiveness when leadership-related factors are taken into account. Their contribution may overlap with other competencies, particularly those related to leadership and digital orientation.

When the correlation and regression results are considered together, a clearer pattern emerges. Several competencies show significant relationships with training effectiveness when examined individually, but most lose their significance when analyzed at the same time. This indicates that many of these variables are related to each other and may influence training effectiveness in overlapping ways. Among all the competencies, embracing digital stands out as the most consistent predictor, pointing to the importance of leaders' openness and readiness to adopt digital approaches.

In general, the results highlight that improving training effectiveness is not only a matter of providing technology or building skills, but also depends on how leaders approach and support digital transformation in practice.

IV. CONCLUSION

The study shows that the Agricultural Training Division in Central Luzon demonstrates generally strong digital leadership practices across the six competencies examined: embracing digital, facilitating the digital drive, digital adaptiveness and resilience, cultivating a digital culture, digital skills, and digital competitive intelligence. The presence of a relatively young and educated workforce, along with supportive leadership, contributes to an environment that is open to digital change. Respondents reported that digital tools have helped improve training delivery, communication, innovation, and access to services, indicating that digital leadership practices are

already contributing to the effectiveness of agricultural training.

The results also show that digital leadership competencies are related to training effectiveness, particularly leadership support, openness to digital technologies, and technical skills. This suggests that the willingness of leaders to adopt and use digital technologies plays a more direct role in improving training outcomes. Other competencies, such as digital culture, adaptability, and skills, appear to support this process but may not independently influence effectiveness when considered alongside leadership mindset. These findings indicate that strengthening digital leadership is not only about improving technical capacity or introducing new tools, but also about shaping how leaders approach digital transformation in their daily work. Leadership support and direction remain important, but their impact may depend on how they are combined with openness to digital change.

Based on these results, it is recommended that agencies continue to strengthen leadership development programs that focus on building openness to digital technologies and encouraging their practical use in training. Continuous capacity-building efforts should also be provided to enhance digital skills among personnel and ensure that training programs are effectively delivered. In addition, strengthening a collaborative work environment that supports knowledge sharing and continuous learning may also help improve the overall effectiveness of training services.

Future studies may consider examining digital leadership practices across the entire agency to provide a broader understanding of how these competencies influence organizational performance and service delivery. Expanding the scope of research may also help identify other factors, such as training design, participant engagement, and resource availability, that contribute to training effectiveness. Such efforts can support the development of more coordinated and effective digital leadership practices within agricultural institutions.

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